

Task 3.2

Quarterly Status Report #2

for the project entitled

Dairy Best Available Technologies in the Okeechobee Basin (SFWMD Contract No. C-11652)

Submitted by

SWET, Inc.
**Soil and Water Engineering
Technology, Inc.**

In Association With

**MOCK•ROOS
CH2M HILL
ENTEL**

November 1, 2002



The
SWET
Team

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Introduction

This is the second quarterly status report for the Dairy Best Available Technologies (BAT) project. This report covers the period from August 1, 2002 to October 31, 2002. The primary activities during this quarter have been completing the review process for the implementation plans, finalizing all Task 2 reports, addressing wetland construction permits issues, conducting routine monitoring, solving monitoring problems, and analyzing the monitoring data.

A final draft of the Task 3.5 implementation plan was submitted to the technical review team (TRT) for review. Their comments are expected by mid-November and will be incorporated into the final implementation plan. After finalizing the implementation plan and obtaining approval from SFWMD, construction can begin. Potential problems that may delay dairymen acceptance and construction are future regulatory issues and disposal of the alum sludges. Meetings were held with the dairymen during October to discuss these issues. The FDEP has also been contacted and agreed to draft a letter to SWET that will explain the regulatory ramifications of alum treatment and sludge handling. A final version should be available by late November.

The Tasks 2.10, 2.11, and 3.2 reports were finalized and distributed to the TRT. Table 1 shows the status of each individual task. A summary of activities associated with monitoring, analysis of the data collected, assessment of the vendor costs and project schedule, and permitting issues are discussed below.

Monitoring Activities and Problem Encountered

As noted in the Status Report #1, flow measurement has been hampered by the sensitivity of the velocity meters being used to measure flow in the streams. The clear water and sediments on the transducers has caused significant noise in the data. Some of this noise has been filtered from the data, which is shown as the corrected velocity in the figures presented in Appendix A. Because the velocity readings were reduced by interferences, the filtering process used the maximum values recorded.

There were also periods when the velocity data was not collected because interferences were too great. To account for missing data, velocity was estimated based on the correlation between velocity and stage during periods of valid readings. These adjustments greatly improved flow estimates, but some known problems still exist in the data. For example, at Davie South, debris on the site fence upstream and downstream of the transducer likely blocked flow and resulted in an underestimation of the actual flow during periods of high flow conditions where flow could bypass the monitored channel due to the blockage. The blockage caused scouring of the stream bottom, which dislodged some of control section blocks. (To correct these problems, the fence has been removed and the transducers remounted on a single 4-foot concrete block. At Davie North, sediment buildup in the culvert has reduced the flow cross-section for the average velocity reading, and therefore actual flows may have been less than measured. A different blockage in the ditch appeared to have been removed around 7/30/02, which

**TABLE 1. STATUS REPORT
FOR
DAIRY BEST AVAILABLE TECHNOLOGIES PROJECT
October 31, 2002**

TASK NO PHASE I	TASK / DELIVERABLES DESCRIPTION	SCHEDULED COMPLETION DATE	STATUS
1	Development of Goals, Performance Measures and Potential Impacts		
	1.1 Project Kick-Off Meeting	11/9/2000	Completed
	1.2 Develop Draft Goals, Potential Impacts/Performance Measures and Evaluation Method	12/2/2000	Completed
	1.3 Conduct and Submit Literature/Data Search and Summary	1/2/2001	Completed
	1.4 Submit Final Goals, Potential Impacts/Performance Measure and Evaluation Method	2/2/2001	Completed
2	Assessment and Selection of Project Sites		
	2.1 Ranking and Selection of Dairy Sites	2/2/2001	Completed
	2.2 Development of Landowner Agreements	4/2/2001	Completed
	2.3 Develop and Submit Draft QAPP and Monitoring Plans	6/2/2001	Completed
	2.4 Formulate Technology Alternatives and Submit Draft Report	6/2/2001	Completed
	2.5 Finalize and Submit Final QAPP and Monitoring Plans for Existing Dairy Conditions	8/2/2001	Completed
	2.6 Finalize Technology Alternatives and Submit Final Report	8/2/2001	Completed
	2.7 Complete Evaluation of Alternatives and Submit Draft Report	9/2/2001	Completed
	2.8 Develop and Submit Draft CNMPs for the Three Selected Dairies	10/2/2001	Completed
	2.9 Prepare for and Conduct One Stakeholders Meeting	10/2/2001	Completed
	2.10 Finalize the Evaluation of Alternatives and Submit Final Report	11/2/2001	Completed
	2.11 Finalize the CNMPs for the Three Selected Dairies and Submit Final Report	11/2/2001	Completed
	2.12 Governing Board Presentation	11/2/2001	Completed
PHASE II	STOP/GO DECISION POINT for Phase II		
	(Requires Governing Board Approval)		
3	Implementation and Monitoring of Alternatives		
	3.1 Farm Level P Load Monitoring		
	3.1.1 Equipment purchase (up to a total of 9 sites)	11/2/2001	Completed
	3.1.2 Install and Test Monitoring Stations (9 stations assumed)	11/2/2001	Completed
	3.1.3 Conduct Routine Field Monitoring Activities - TP (52 Biweekly trips from RPB)	Starting 11/2/2001	Started 5/1/02
	3.1.4 Laboratory Analyses (assume 9 biweekly samples for 52 trips TP @\$15/sam.)*	Starting 1/2/2002	Started 5/1/02
	3.1.5 Labor & Lab for 9 monthly samples for 24 mo. Fecal and TSS @ \$45/sample *	Starting 1/2/2002	Started June, 2002
	3.2 Preparation and Submittal of Quarterly Reports	Starting 11/2/2001	Second quarterly report
	3.3 Develop Draft Vendor Project Documents, including bid specifications and agreements	1/2/2002	Completed
	3.4 Finalize Vendor Project Documents	3/2/2002	Completed
	3.5 Develop and Submit Draft Implementation Plan for Selected Technologies	3/2/2002	Completed
	3.6 Development of the Draft Monitoring Plan for Selected Technologies	3/2/2002	Waiting on approval of implementation plan
	3.7 Development of the Final Implementation Plan for Selected Technologies	5/2/2002	Waiting on comments from draft
	3.7.1 Cost of Implementing Vendor Technology (prepare & review bids)	Starting 5/2/2002	To be scheduled
	3.7.2 Review and Inspect Vendor Construction Activities	Starting 5/2/2002	To be scheduled
	3.7.3 Vendor Payments	Starting 5/2/2002	To be scheduled
	3.8 Develop and Submit Final Monitoring Plan for Selected Technologies	Starting 5/2/2002	To be scheduled
	3.8.1 Equipment Purchase (up to a total of 6 sites)	6/2/2002	To be scheduled
	3.8.2 Install and Test Monitoring Stations (Assumed 6 additional stations)	6/2/2002	To be scheduled
	3.8.3 Conduct Routine Monitoring Activities - TP (34 Biweekly trips from RPB)	Starting 8/2/2002	To be scheduled
	3.8.4 Laboratory Analyses (assume 6 TP samples @ \$15/sample)*	Starting 8/2/2002	To be scheduled
	3.9 Prepare for and Attend Bi-annual Site Meeting (5 qtrs)	Starting 8/2/2002	To be scheduled
	3.10 Prepare for and Conduct Public Workshop	11/2/2002	To be scheduled
	3.11 Submit Workshop Minutes	12/2/2002	To be scheduled
4	Evaluation of Alternatives Performance		
	4.1 Prepare and Submit Draft Final Report	9/2/2003	To be scheduled
	4.2 Prepare for and Conduct Public Workshop	10/2/2003	To be scheduled
	4.3 Prepare and Submit Final Report and Associated Project Data	11/2/2003	To be scheduled
	4.4 Prepare and Submit Workshop Minutes	11/2/2003	To be scheduled
Total for Project		11/2/2003	

lowered the water levels in it. This meant the transducer was no longer correctly placed with respect to the water level. During some lower flow events, the transducer was too high to collect data. The transducer will be lowered.

Analysis of Flow and Water Quality Data

The flow and water quality data for the monitoring sites has been analyzed (see Appendix A). Please refer to updated site maps in Appendix B for specific locations of monitoring sites.

Table 2 provides a summary of the estimated flow and phosphorus loads from the sites. As previously noted, the estimated flow volumes are subject to error. In spite of these potential errors, the equivalent depth of runoff estimates indicates that the assumed drainage areas may not be correct. The most noticeable discrepancy is for the drainage basin upstream of Davie East. It was assumed the stream from the land upstream of the dairy's heifer pasture east of Berman Road had been blocked, but it appears that about an additional 500 acres must be contributing runoff to the site to account for the high flows observed there.

Flow was recorded at all sites except for Site KREA 41, which had no flow during the period of record. Because the transducer at Site KREA 41 is approximately 2 feet below the overflow weir crest, the indicated small stages were never enough to cause flow. Therefore, the one water quality sample collected at the site was from stagnant water. Site KREA 41B, on Boat Ramp Road, had very little flow compared to the other sites indicated, which is likely due to greater onsite storage.

The phosphorus data (Figure A-27) are consistent with District data measured at the same locations. The phosphorus data are also presented on the flow plots Figures (A3 to A26) to show the sample compositing period and how the phosphorus concentrations relate to flow. Fecal coliform levels (Figure A28) are generally very low except for a few sites that have animal grazing around or just upstream of the site. At most of the sites, the level of total suspended solids (TSS) levels are low (Figure A29), but are similarly correlated with nearby animal grazing.

The equipment blanks analyzed as part of the quality assurance program were all below detectable limits, which indicate excellent field protocol. The results from all duplicate samples were within 4% of each other, except for one sample collected at KREA 49A on 8/21/02. This duplicate was significantly lower and not consistent with any other data at the site, which indicates a potential recording or protocol error. The duplicate was removed from the analysis.

Vendor Progress

The vendors have completed 90% designs for the three dairies. These designs were included in the Draft Implementation Plan that is being reviewed by the TRT. The vendors and their contractors are ready to start construction as soon as approval from the

Table 2. Summary of Flow and P Concentration Data for Dairy BAT Monitoring Sites

Dairy Name	Davie Dairy			Butler Oak Dairy				Dry Lake Dairy	
Site Name	Davie South	Davie North	Davie East	KREA 41	KREA 41A	KREA41B	KREA10D	KREA 32B	KREA 49A
Volume (ac-in)	8734	1309	4307	0	5103	9	1697	726	469
Runoff (in)	5.52	4.04	13.29	0.00	2.38	0.11	0.93	1.88	1.56
Area (ac)	1583	324	324	0	2141	81	1821	386	300
P load (lbs)	2265	1026	340	0	1098	9	212	517	446
Flow Avg P (ppm)	1.14	3.46	0.35	4.48	0.95	4.50	0.55	3.15	4.19

District is received. A summary of the costs by the vendors to date is provided in Table 3. All of the costs have been for surveying, environmental assessments, and engineering. These activities are nearly complete, and therefore the remainder of the vendor budget will be predominantly for construction. It is anticipated that approval for construction will be received by December 1, 2002. Construction is expected to begin by mid-December and is scheduled to be completed by April 1, 2002. Table 4 provides an adjusted project schedule.

Permitting Issues

Obtaining the Army Corps of Engineers (ACOE) permits for construction in wetlands at Davie and Dry Lake dairies have become more difficult than anticipated. The Davie Dairy permit was about to be issued when the ACOE decided to ask the Fish Wildlife Service (FWS) for their opinion on the project. Mr. John Wrublik (FWS) has visited both sites, but has not yet presented his findings. Ms. Irene Sadowski (ACOE) has indicated that Mr. Wrublik is looking for grasshopper sparrow habitat. If the FWS finds grasshopper sparrow habitat, then a full environmental assessment of the project's impacts on them will probably need to be completed. At Dry Lake, the ACOE determined that the wetlands interior to the impoundment should also be considered impacted, and therefore the minor impact permit was not applicable. Subsequent to this decision, the ACOE put the permit application out for public notice, which ended on October 31st. The only meaningful comments came from the EPA (Environmental Protection Agency), which wanted a significant amount of additional information. A response to the EPA's comments is being drafted by SWET for submission to the ACOE.

At the Bulter Oaks dairy, the permit for moving the gopher tortoises has received a three month extension. This means tortoises do not have to be moved before obtaining final construction approvals.

On final permitting note, the stormwater treatment standard, which covers the edge-of-farm treatment systems being built as part of this project, has been drafted by NRCS and submitted to their Washington staff for final approval. SWET initiated the effort to develop this standard and has supported NRCS during their work on it. This standard will be very useful for getting the treatment systems permitted under the NPDES program for the dairies that is being adopted by FDEP. The final decision on the inclusion of the treatment systems under the NPDES permit will not occur until performance data from the systems becomes available.

Table 3. Invoiced Expenditures for Vendors through October 15, 2002

Vendor Name	Percentage Completion	Invoiced through October 15, 2002
Engineering & Water Resources, Inc.	19.2	\$110,472.69
CDM	18.5	\$106,392.95
Environmental Research & Design	14.0	\$80,273.85
Total	17.2	\$297,139.49

Table 4. EOF Implementation Schedule

Tasks	Schedule 2002/2003						
	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Construction approval							
Construction permits obtained							
Final construction drawings							
Start of construction							
Construction							
Substantial completion							
Completion of construction							
Monitoring plan and installation							
Monitoring started							

APPENDIX A

FLOW AND WATER QUALITY DATA FOR MONITORING SITES

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- Figure A-7. Davie South - Stage
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- Figure A-10. KREA 41 - Stage
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- Figure A-14. KREA 41A - Flow and P Concentration
- Figure A-15. KREA 41B - Stage
- Figure A-16. KREA 41B - Velocity
- Figure A-17. KREA 41B - Flow and P Concentration
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- Figure A-20. KREA 10D - Flow and P Concentration
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- Figure A-27. Total P Concentrations at Monitoring Sites
- Figure A-28. Fecal Coliform at Monitoring Sites
- Figure A-29. Total Suspended Solids Concentrations at Monitoring Sites

Figure A-1. Davie North - Stage

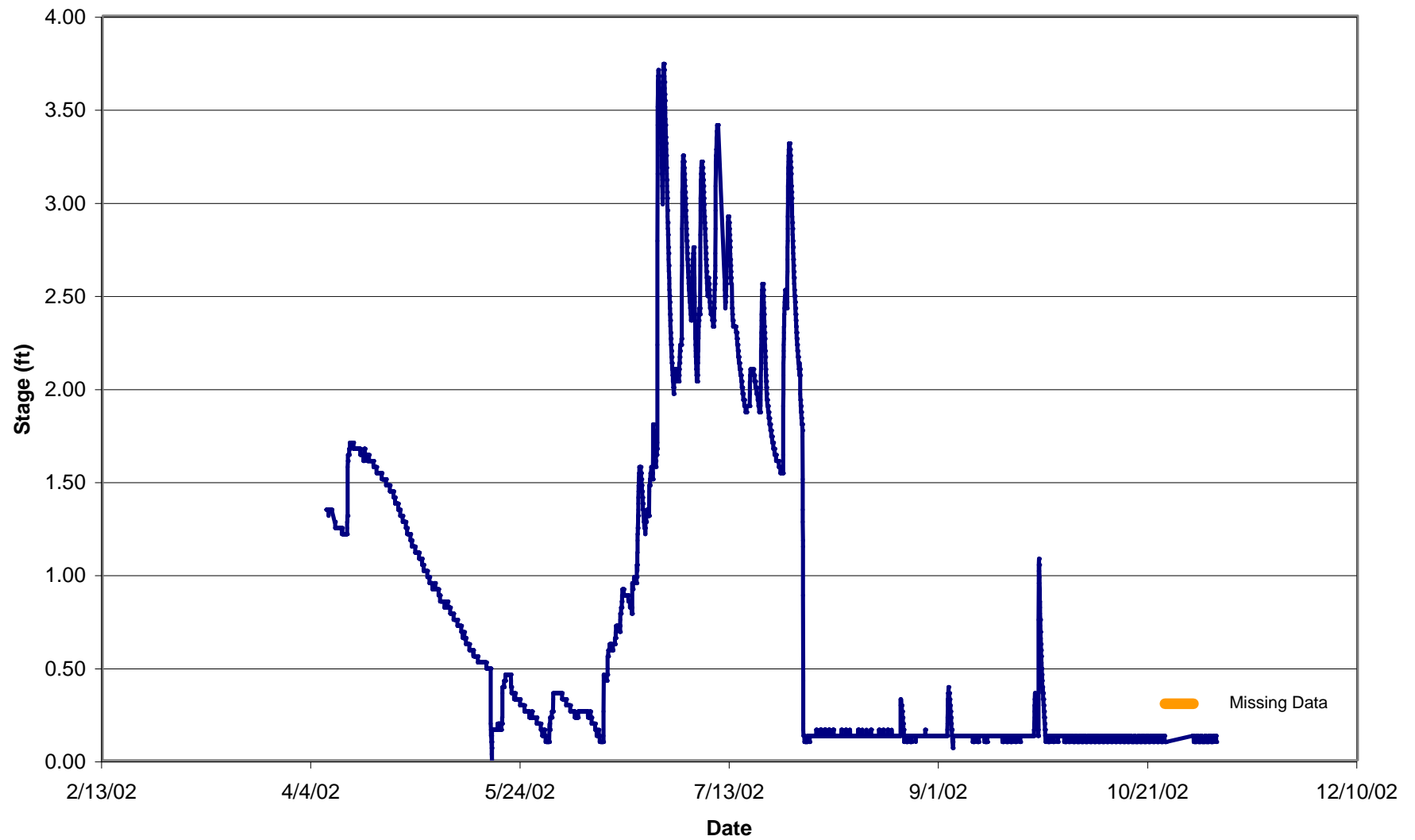


Figure A-2. Davie North - Velocity

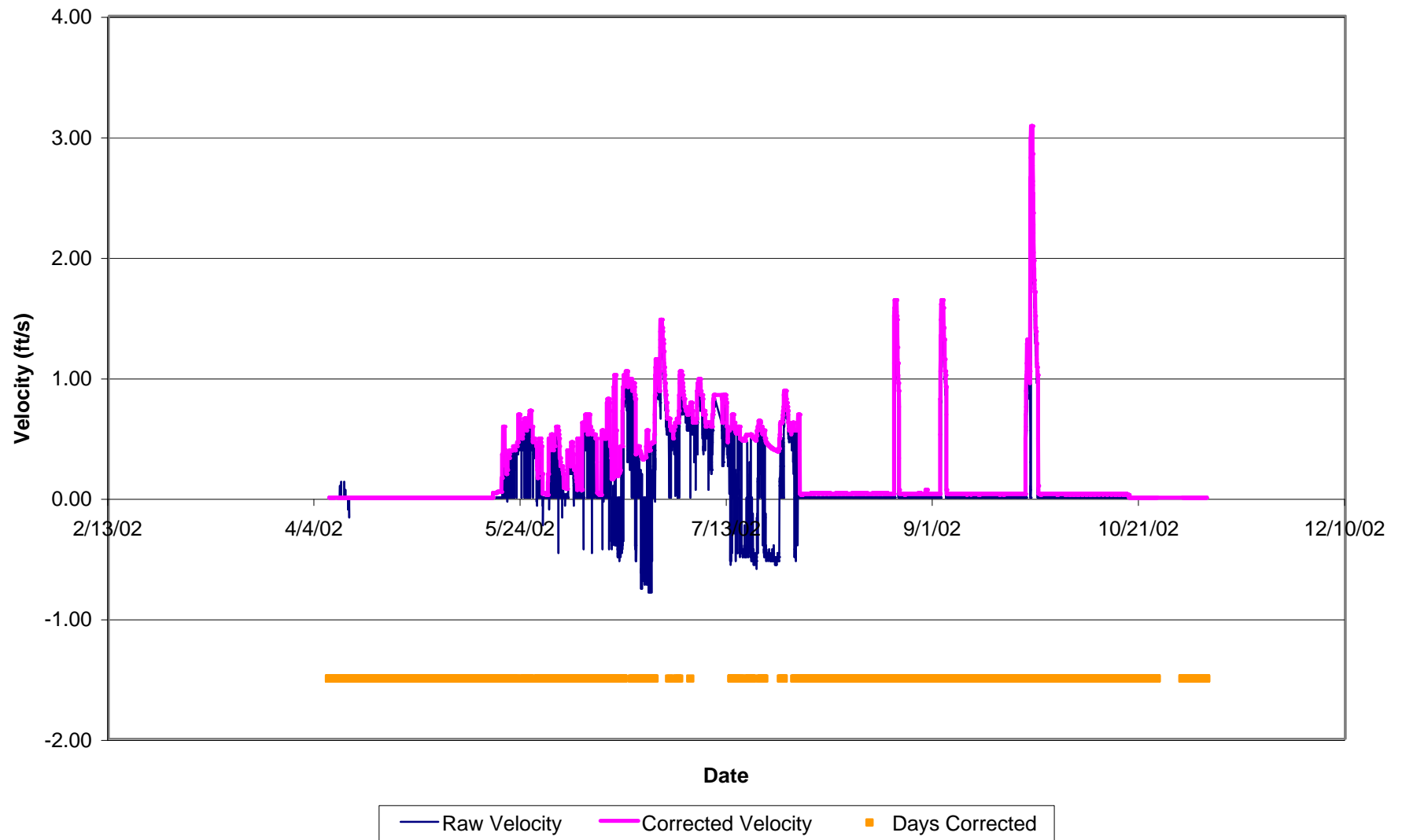


Figure A-3. Davie North - Flow and P Concentration

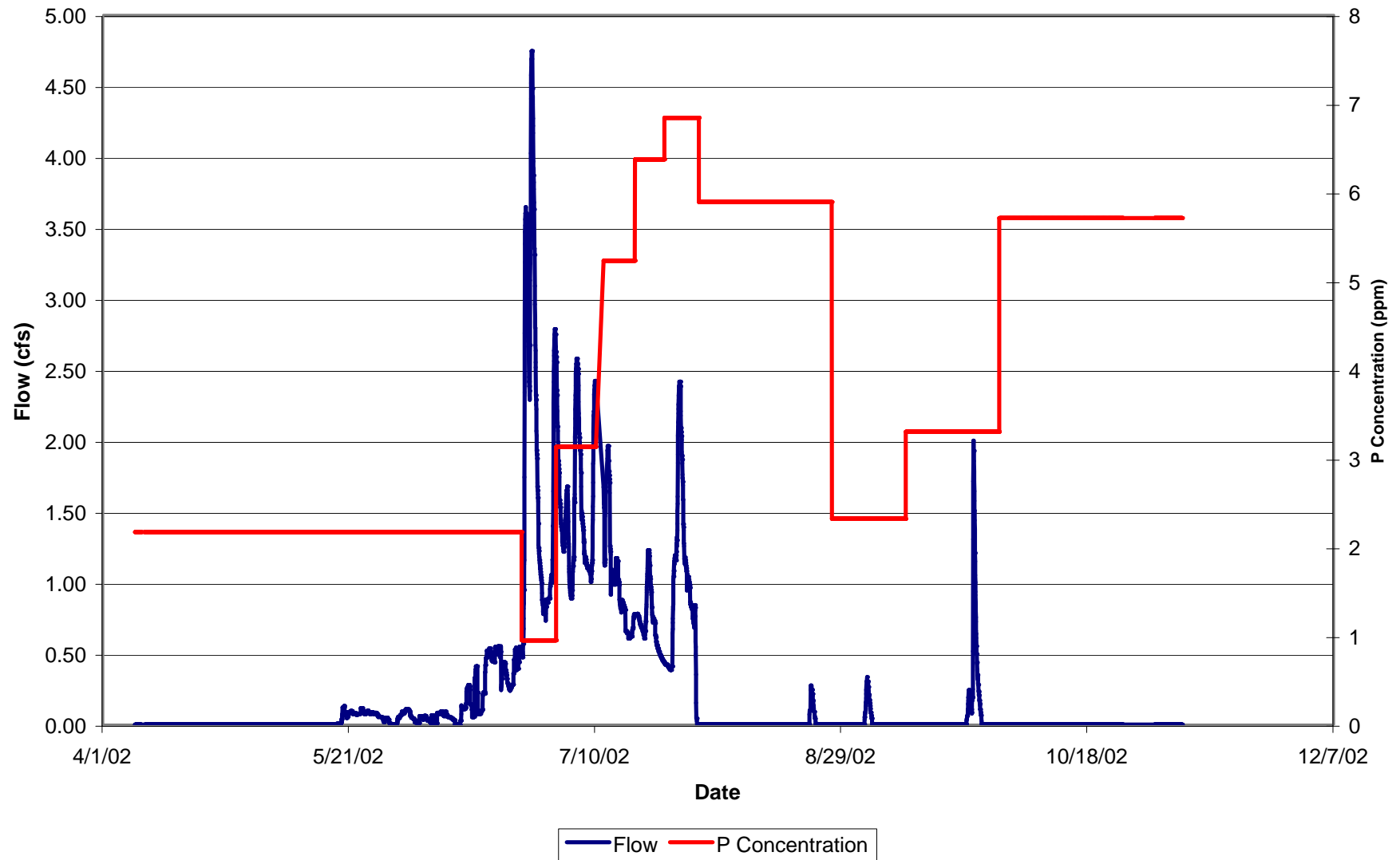


Figure A-4. Davie East - Stage

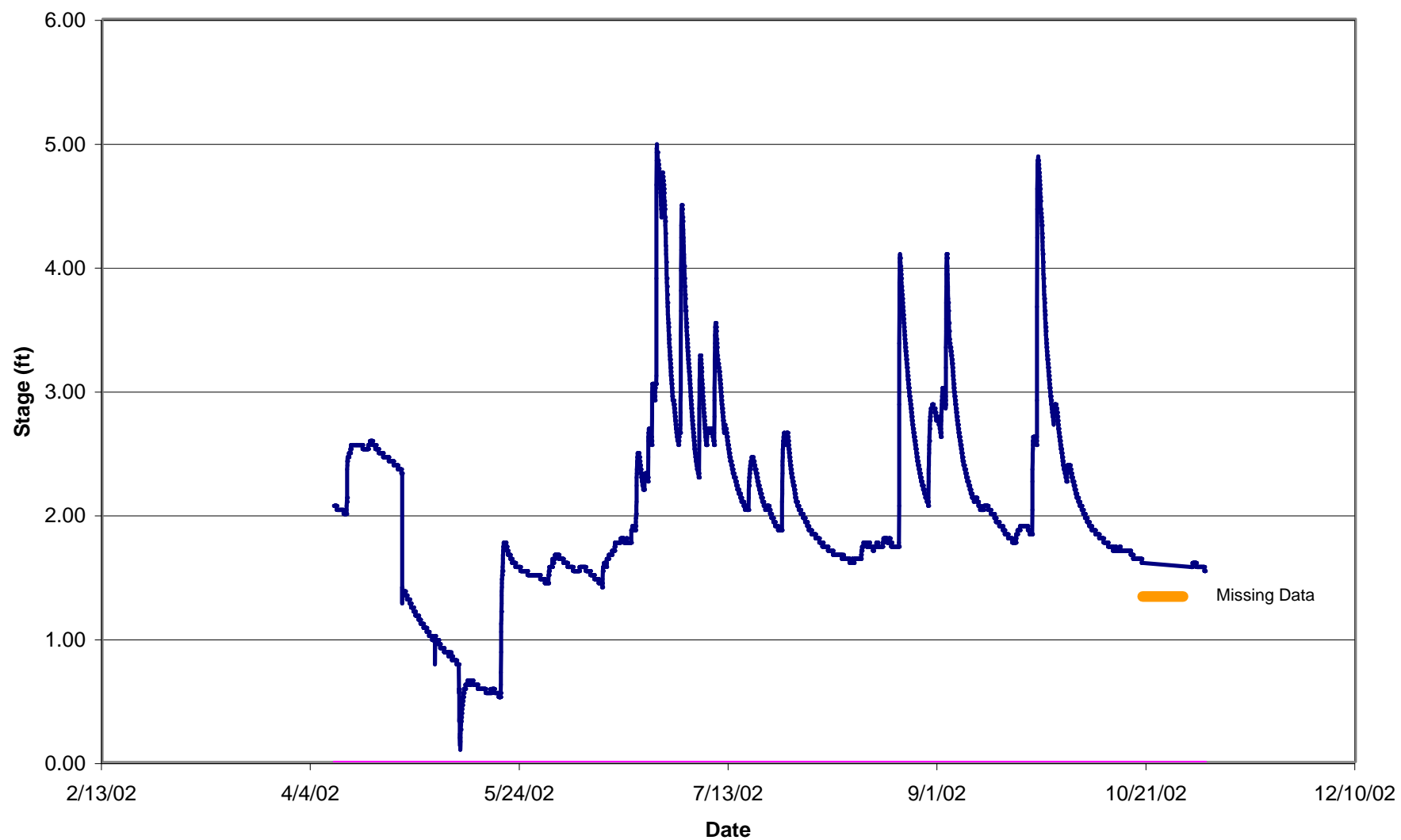


Figure A-5. Davie East - Velocity

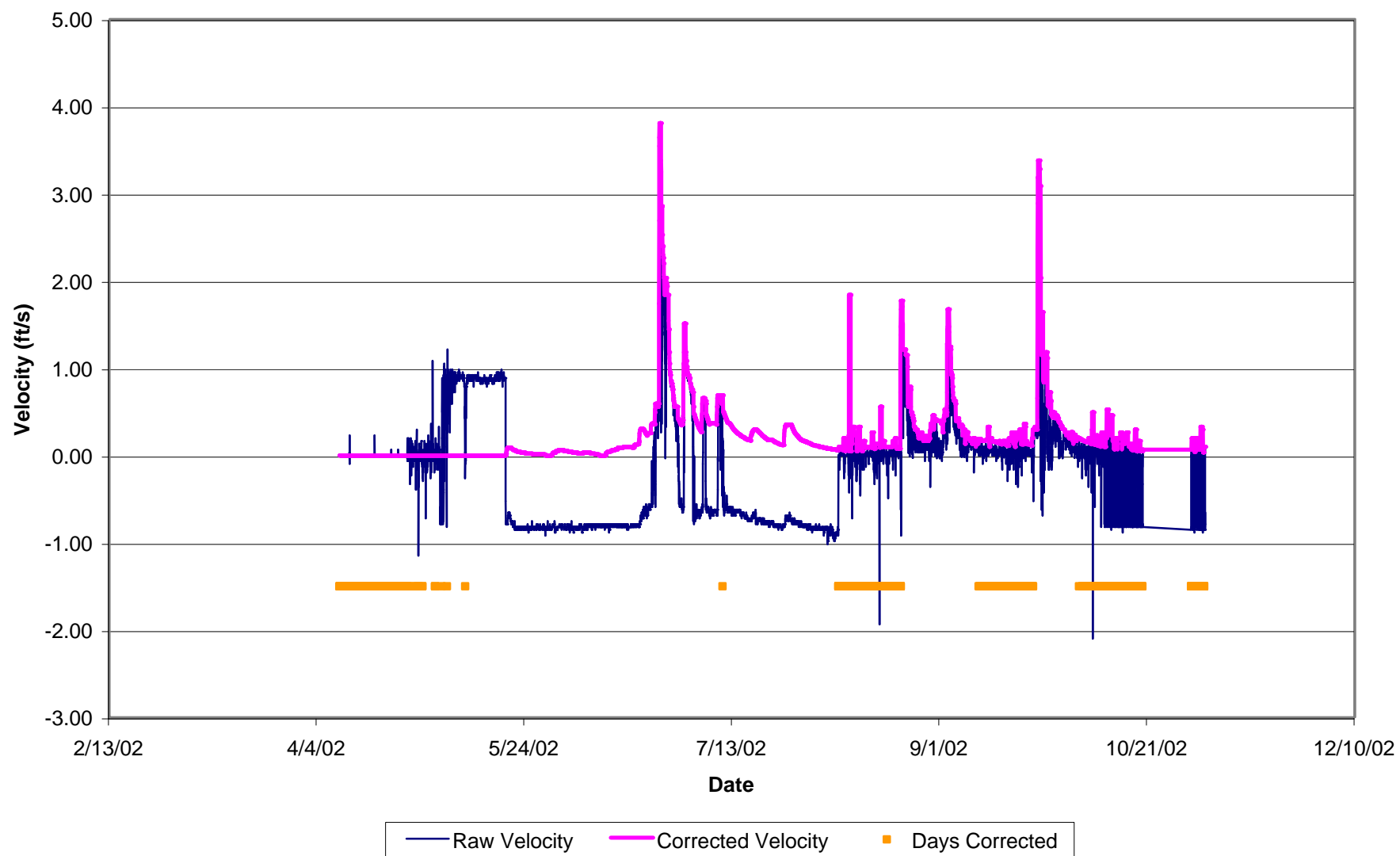


Figure A-6. Davie East - Flow and P Concentration

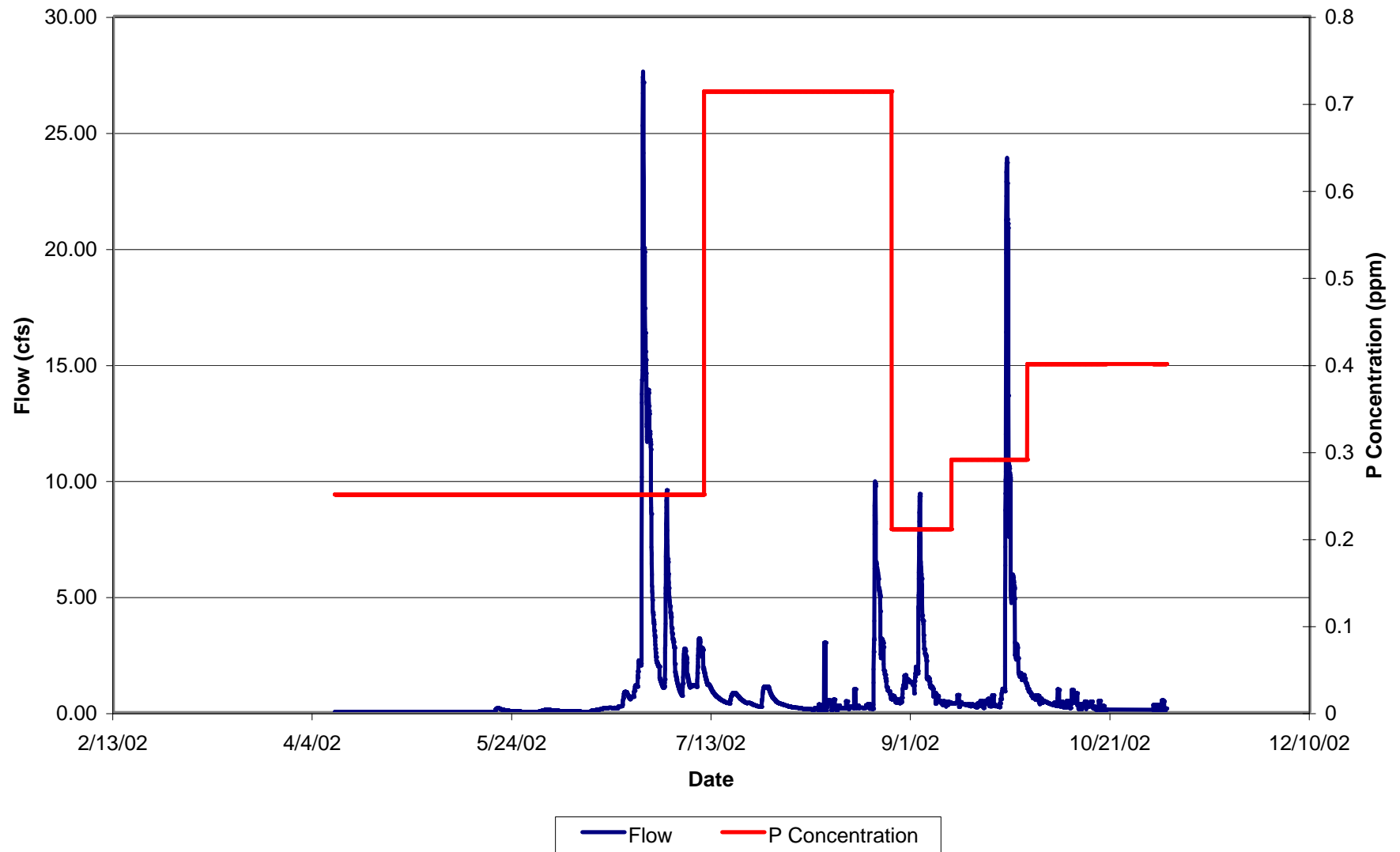


Figure A-7. Davie South - Stage

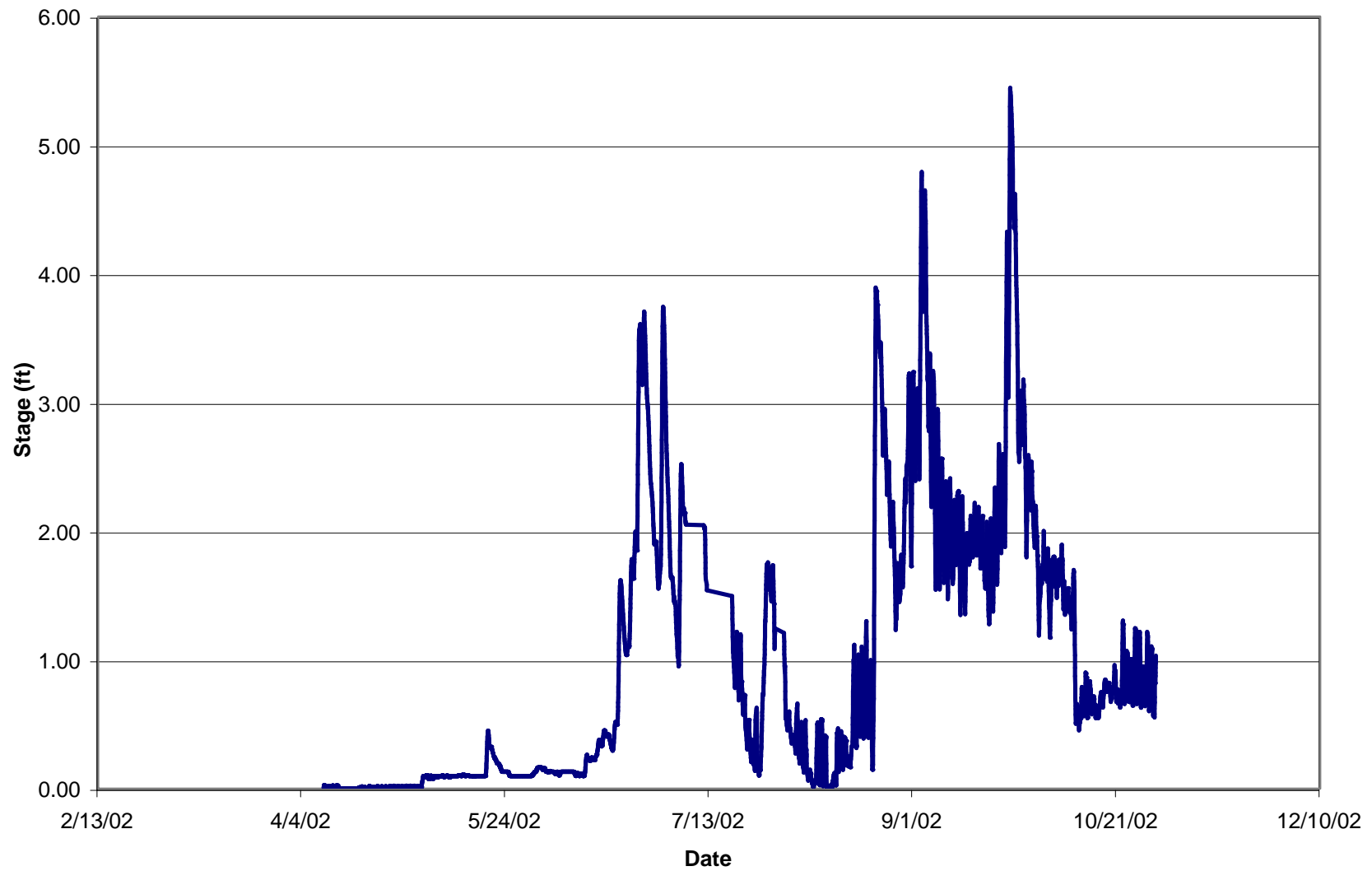


Figure A-8. Davie South - Velocity

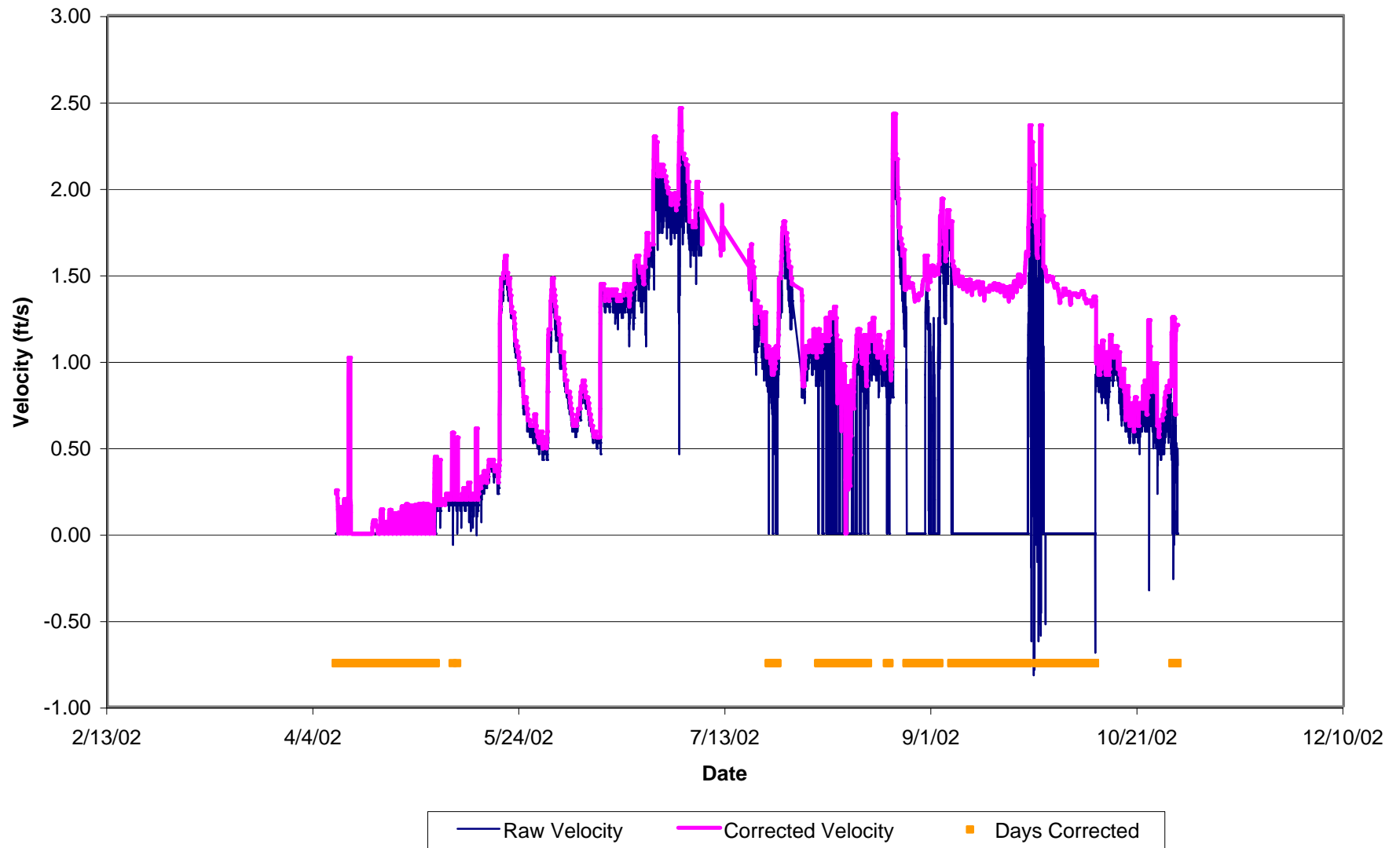


Figure A-9. Davie South - Flow and P Concentration

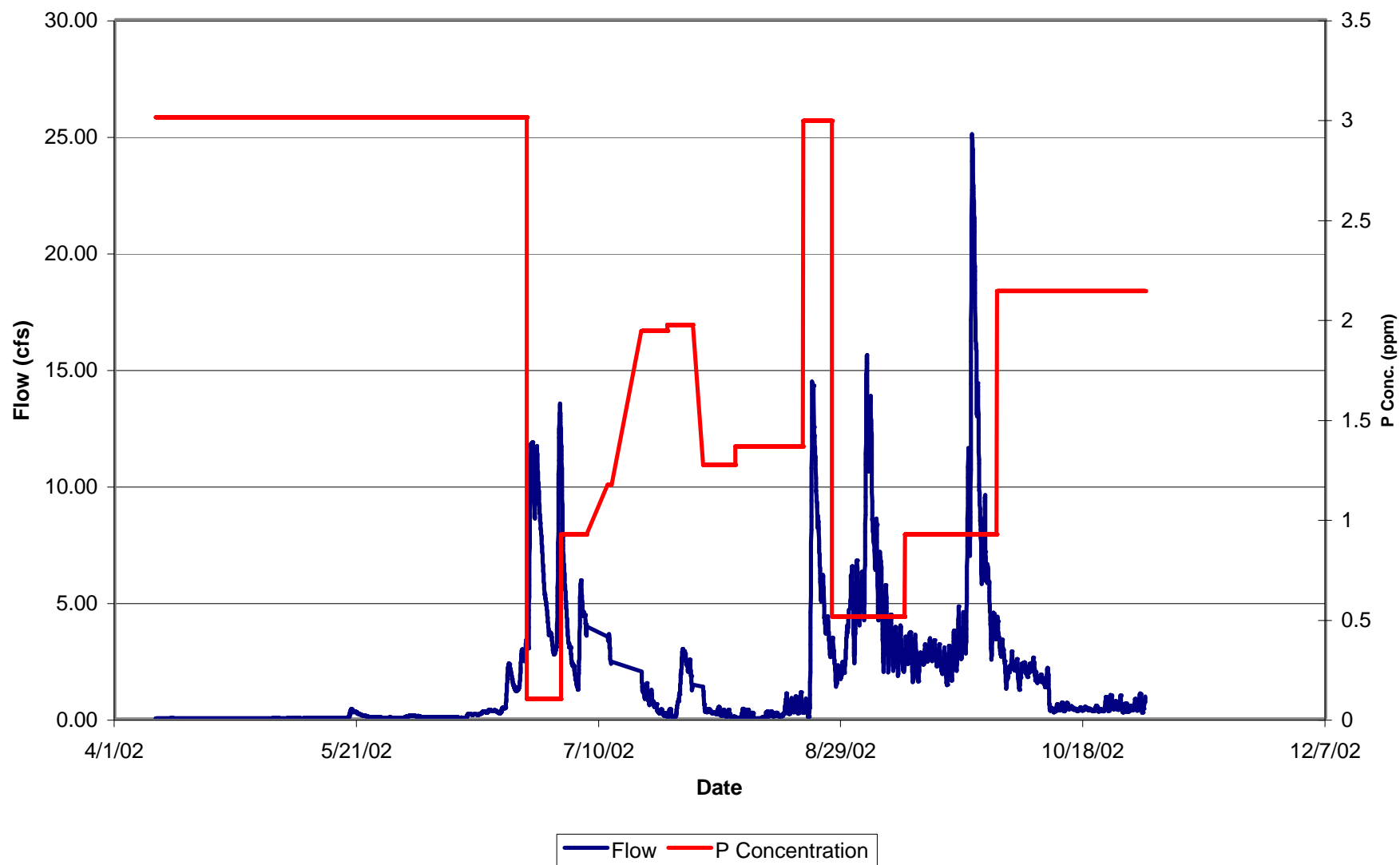


Figure A-10. KREA 41 - Stage

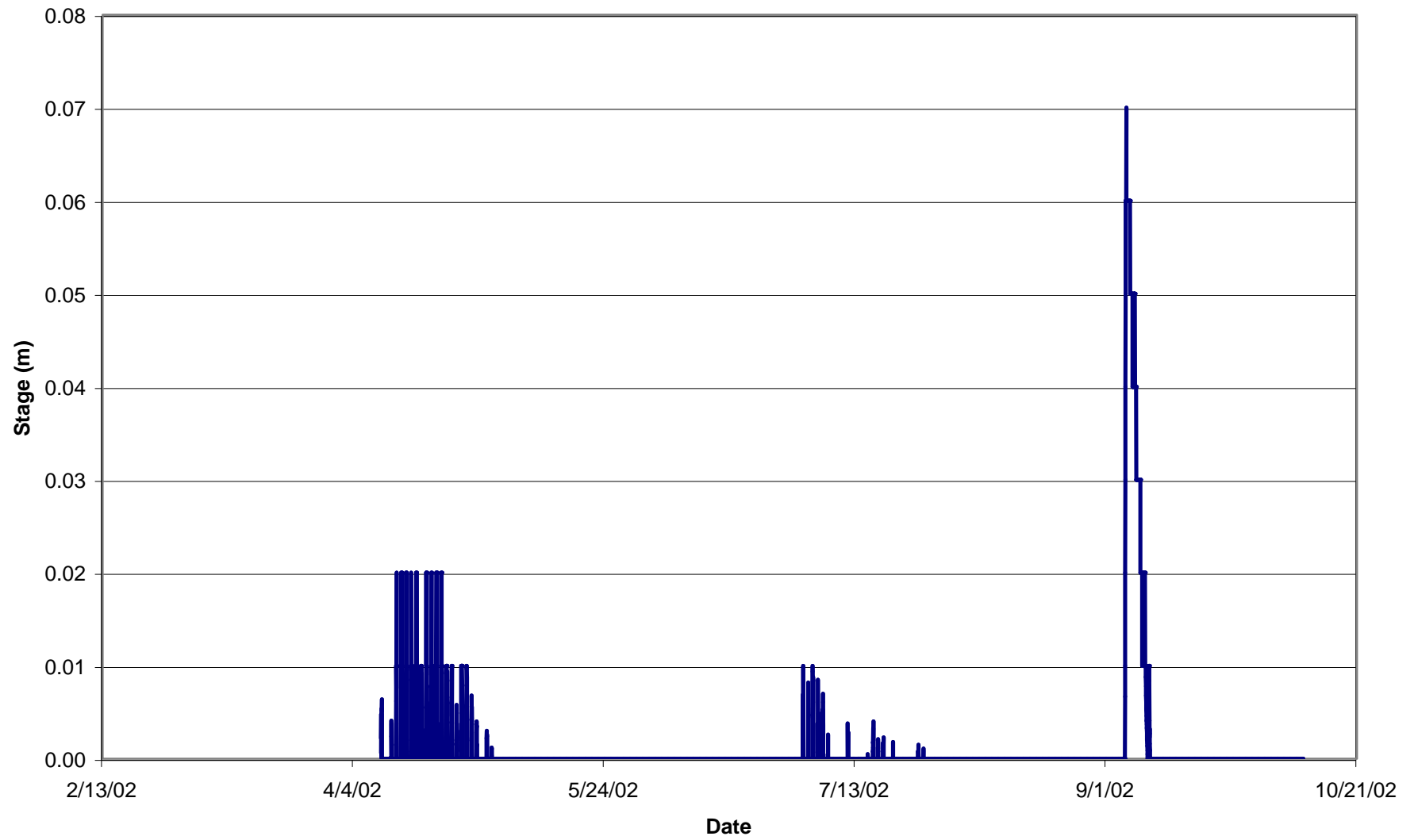


Figure A-11. KREA 41 - Velocity

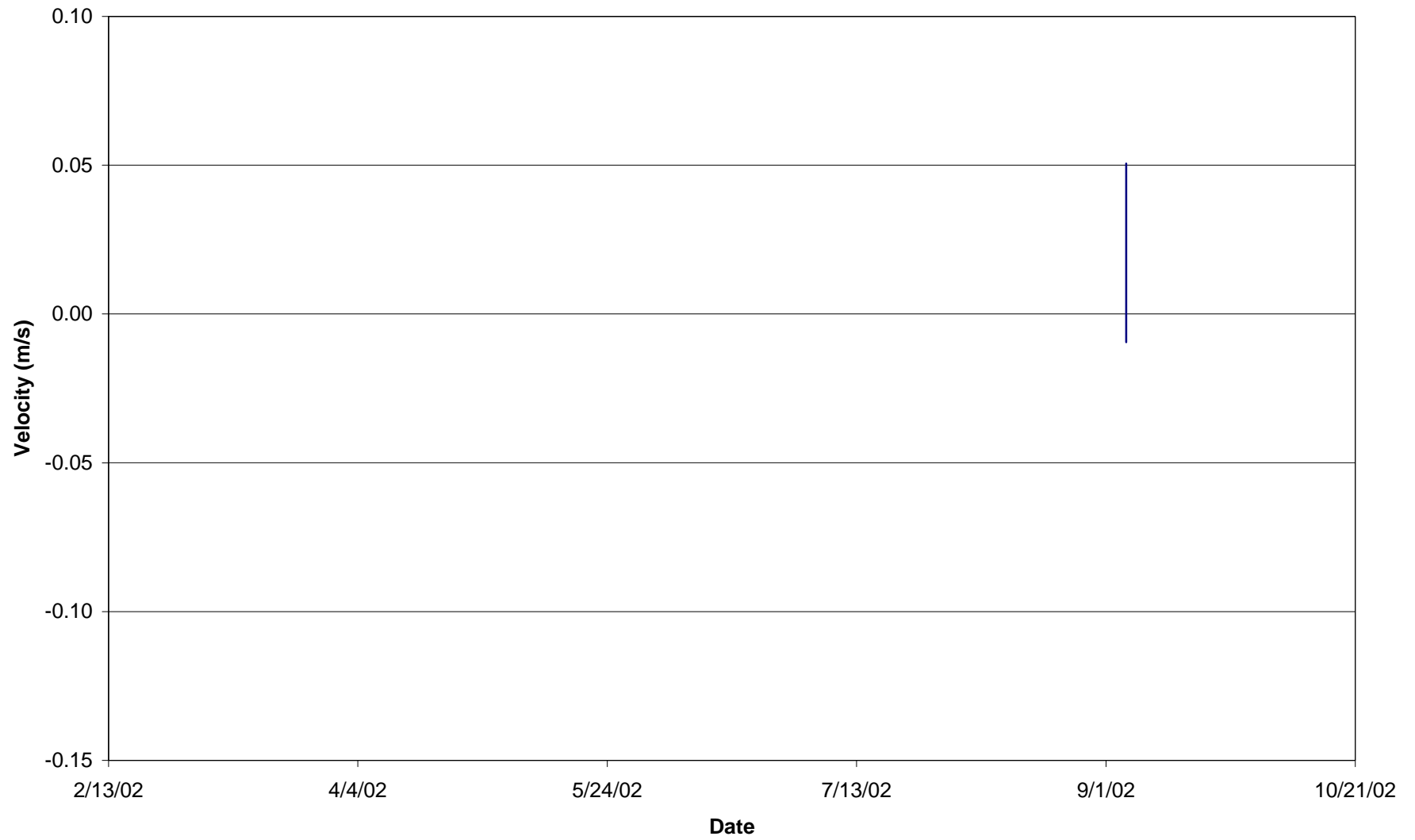


Figure A-12. KREA 41A - Stage

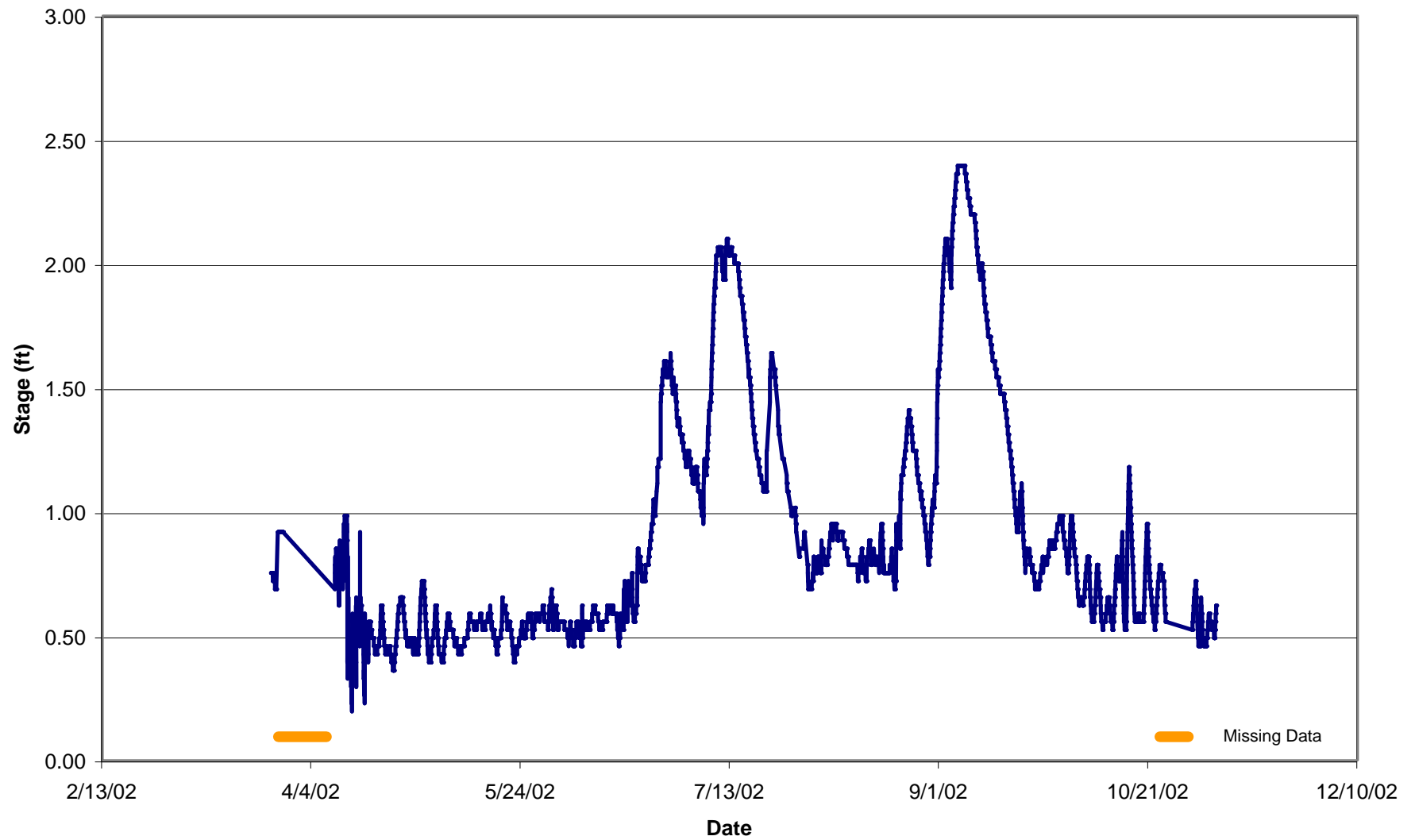


Figure A-13. KREA 41A - Velocity

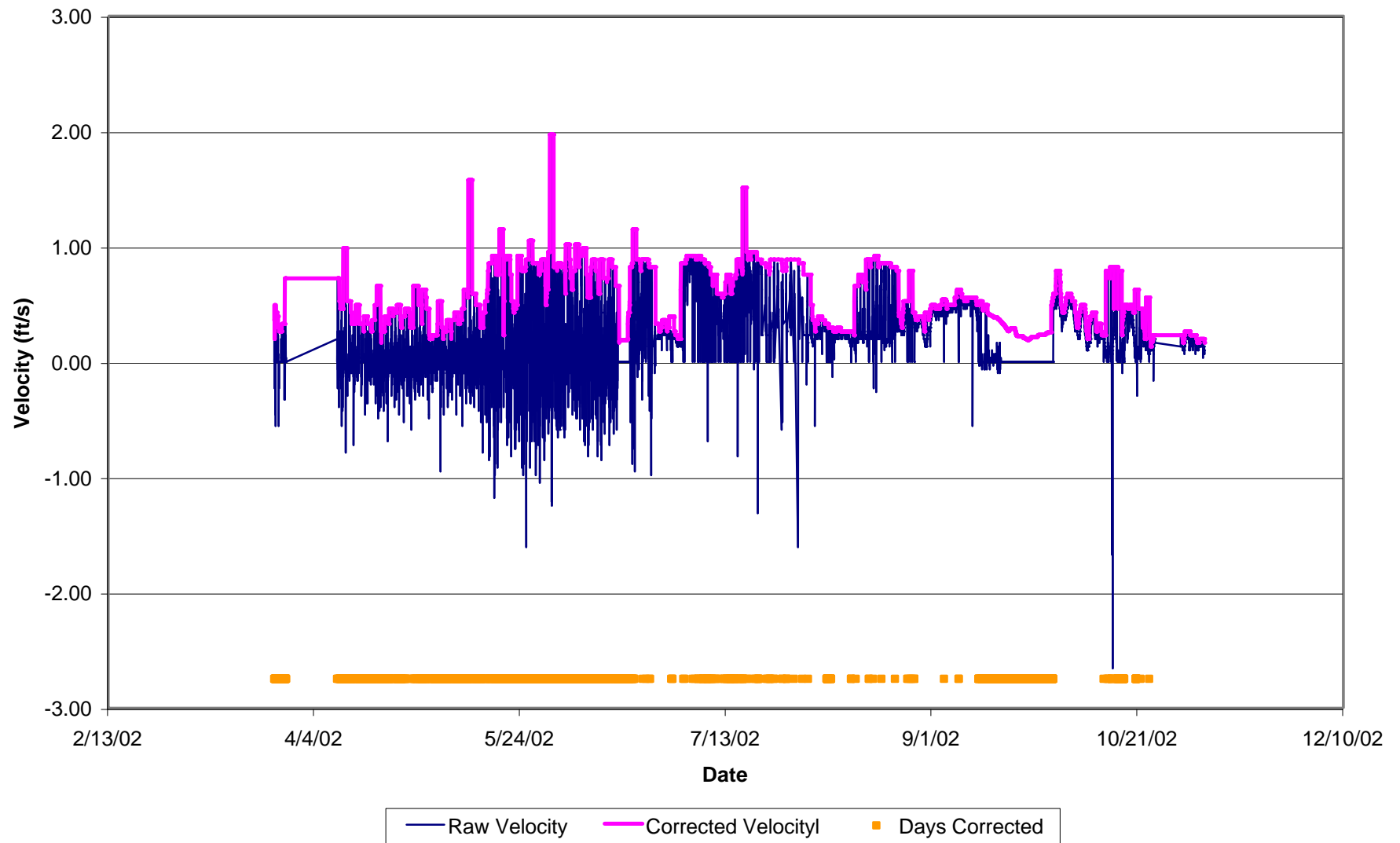


Figure A-14. KREA 41A - Flow and P Concentration

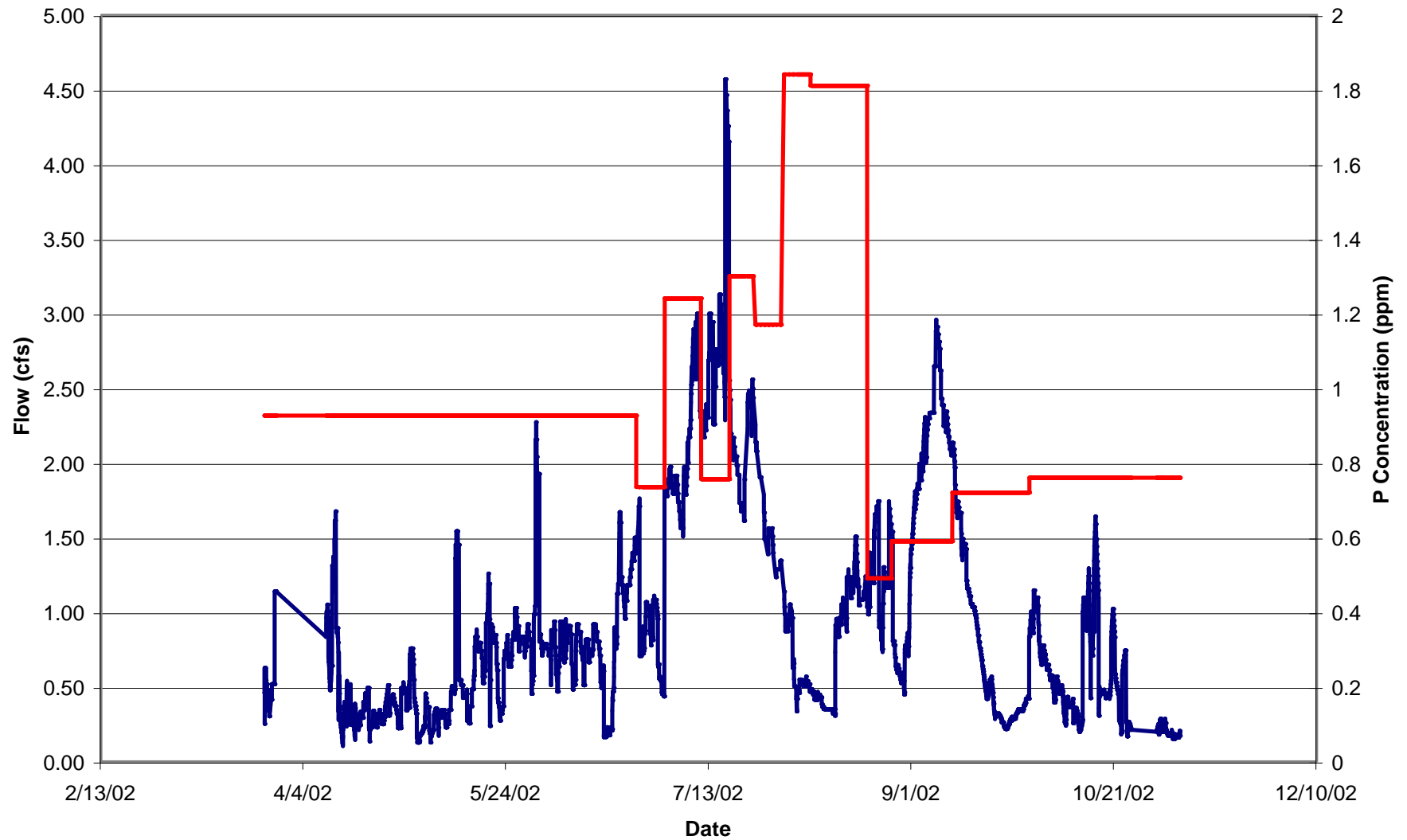


Figure A-15. KREA 41B - Stage

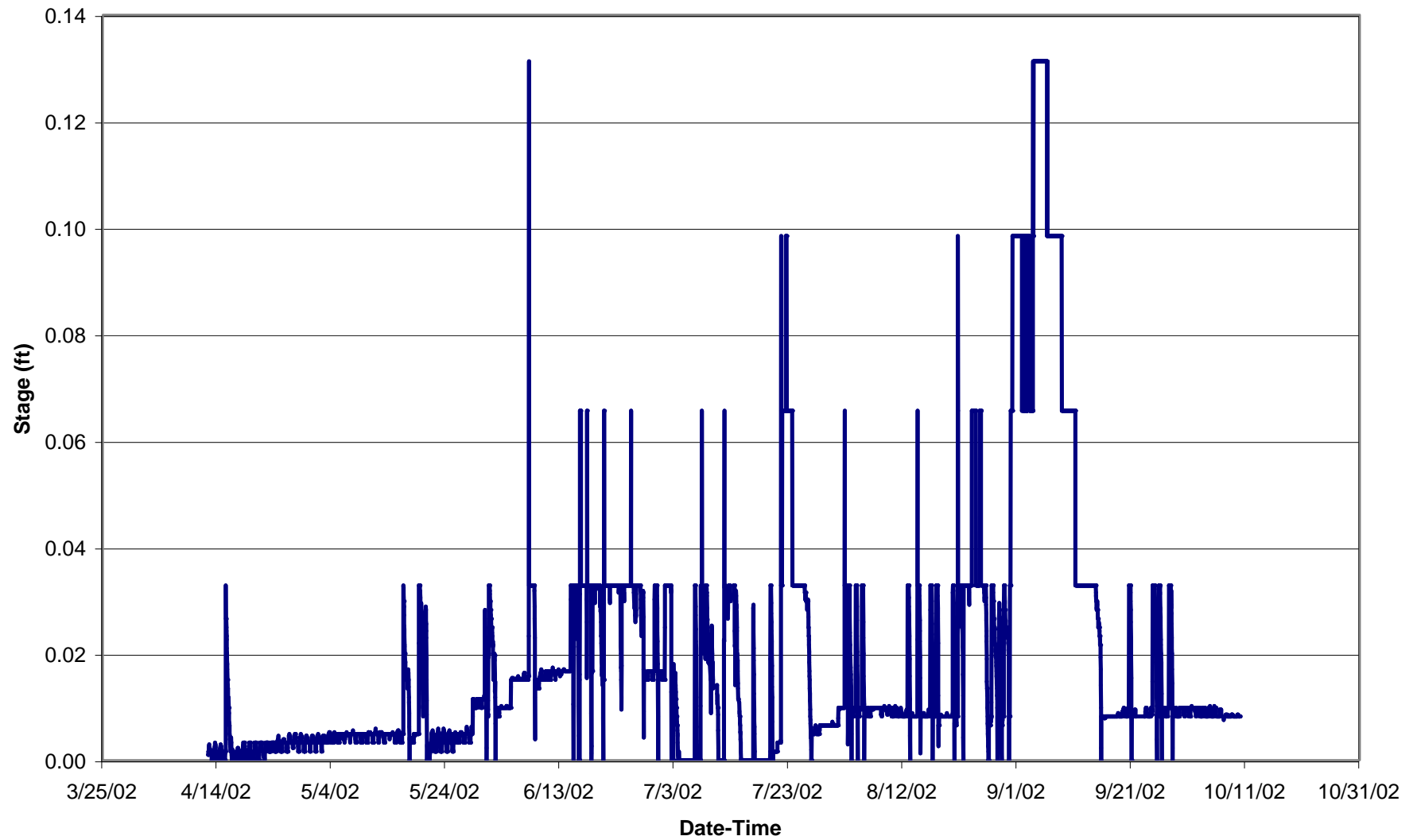


Figure A-16. KREA 41B - Velocity

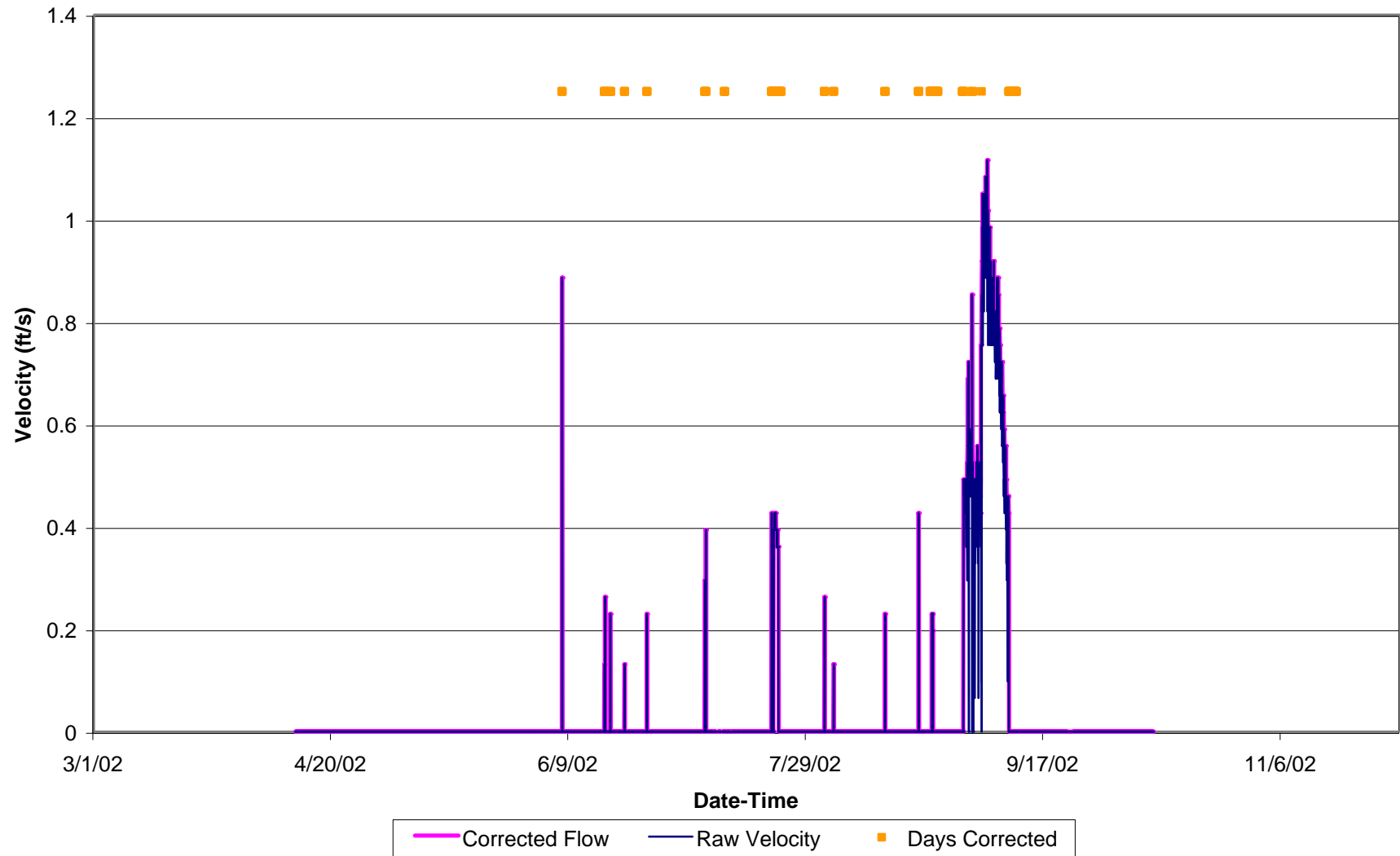


Figure A-17. KREA 41B - Flow and P Concentration

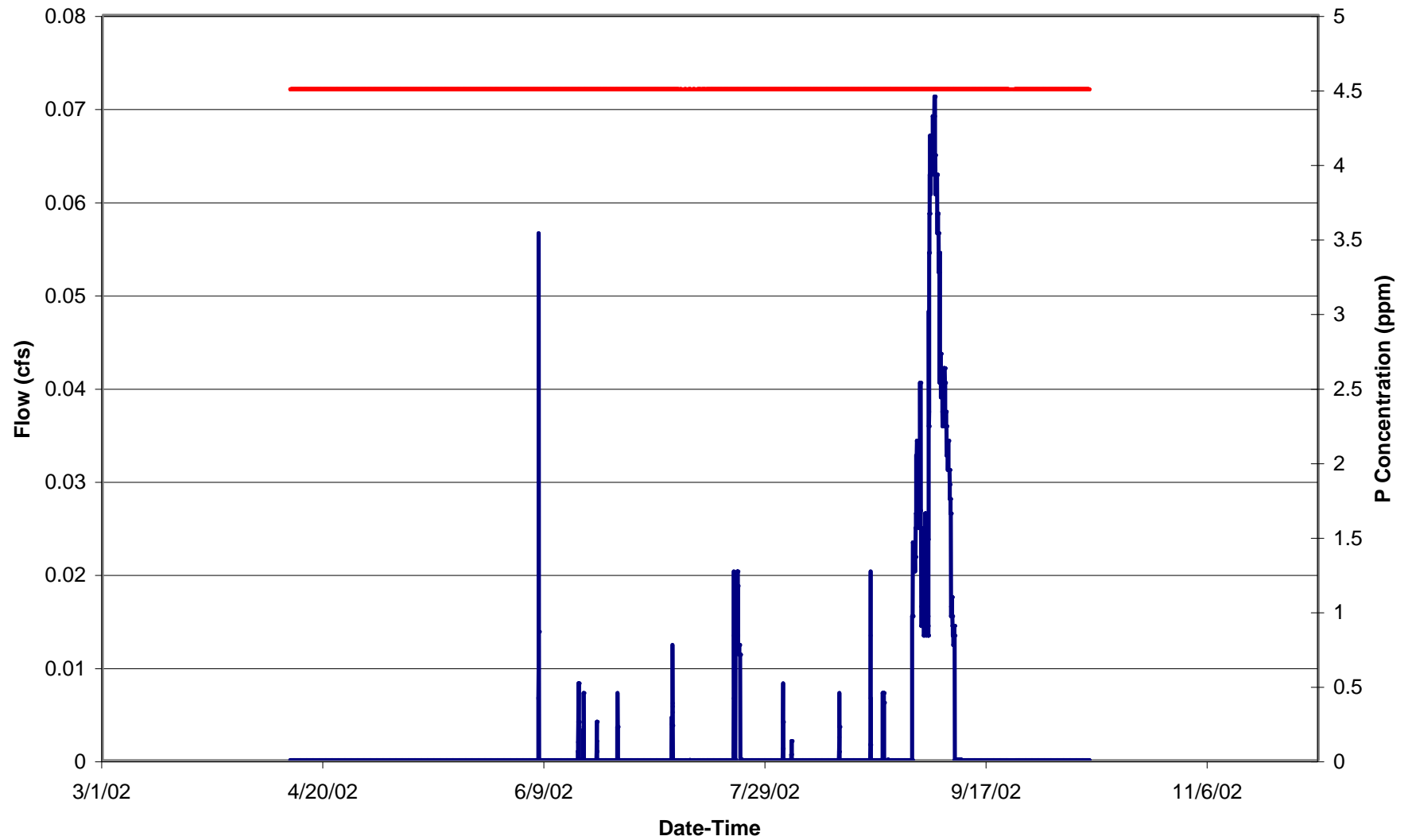


Figure A-18. KREA 10D - Stage

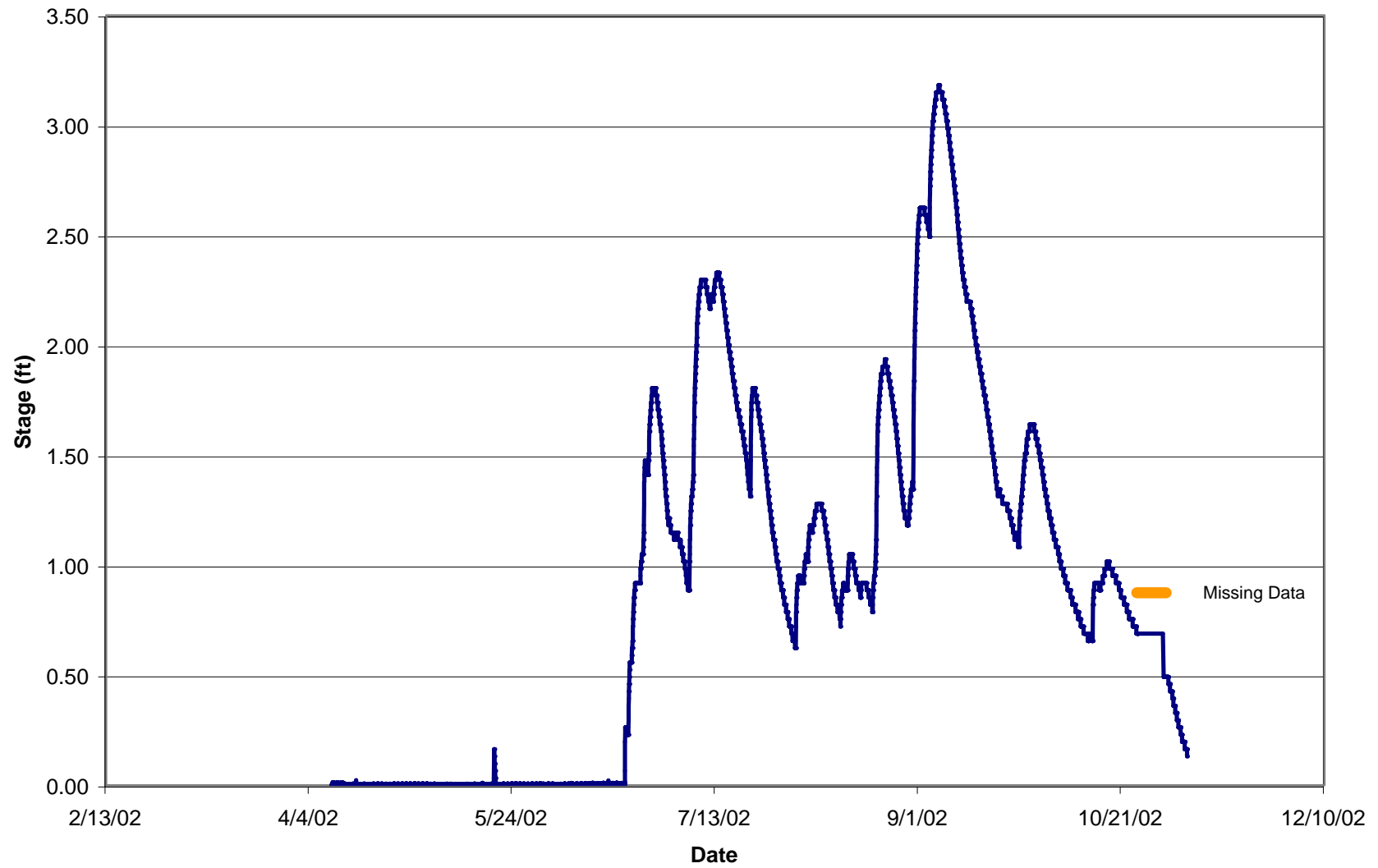


Figure A-19. KREA 10D - Velocity

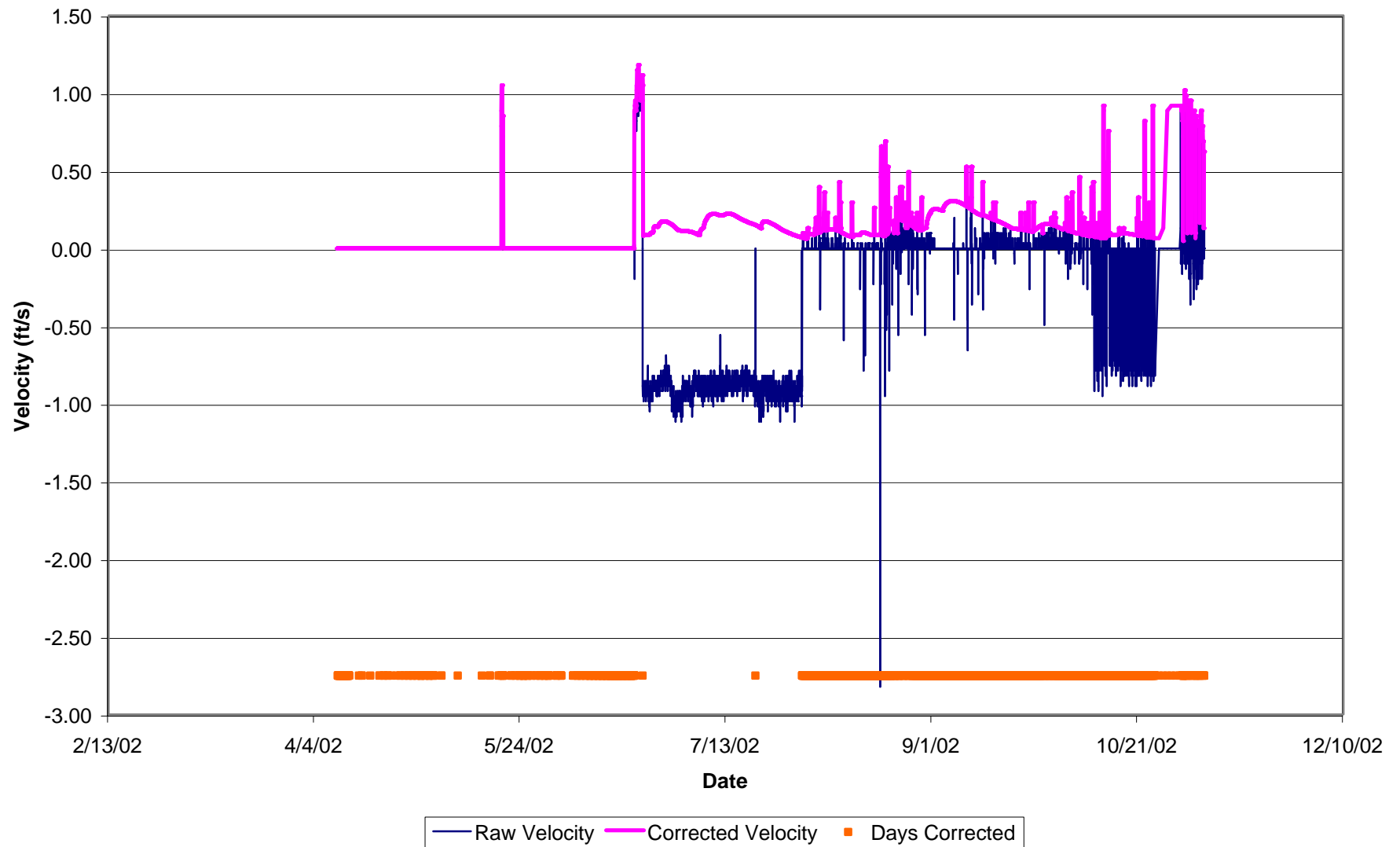


Figure A-20. KREA 10D - Flow and P Concentration

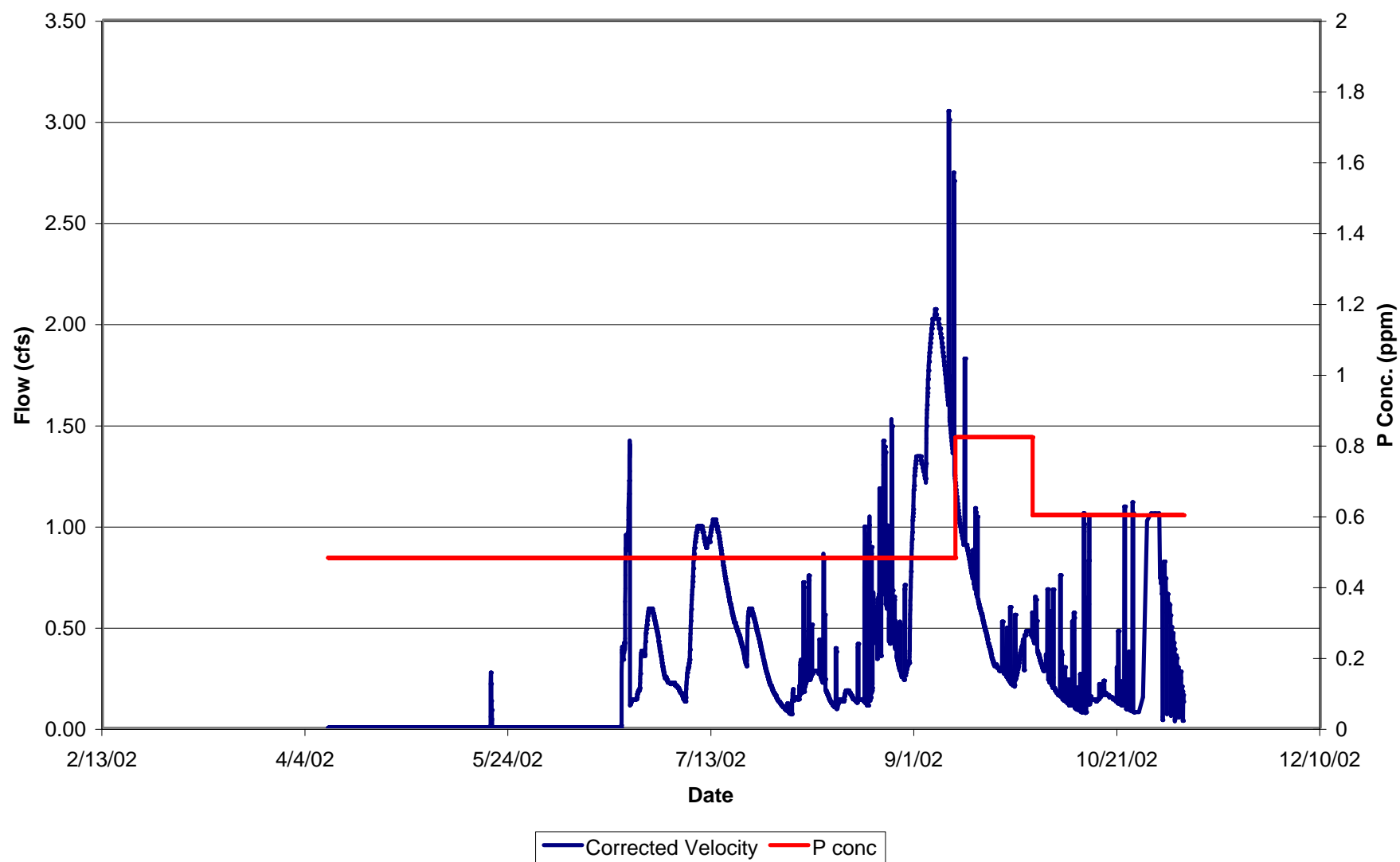


Figure A-21. KREA 32B - Stage

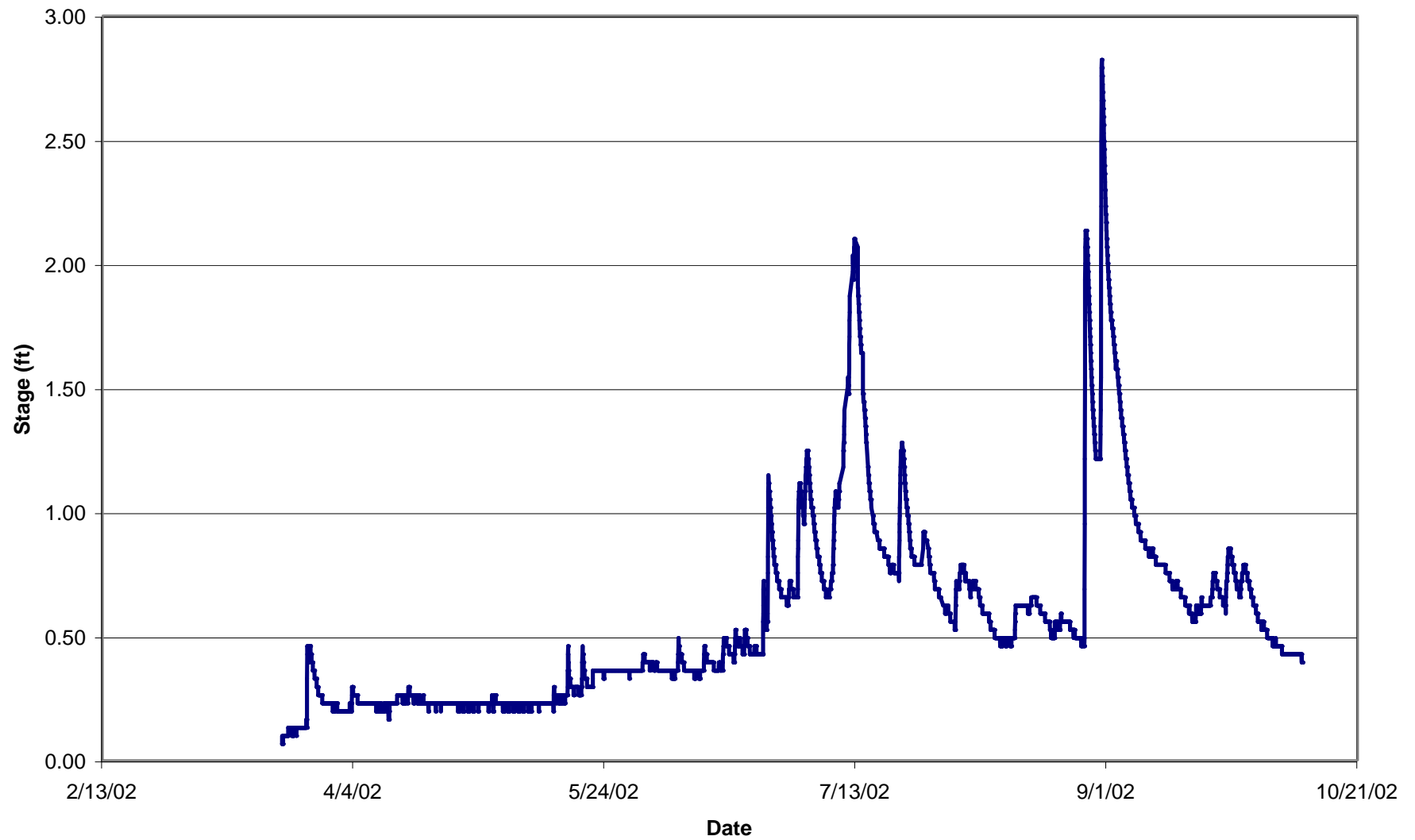


Figure A-22. KREA 32B - Velocity

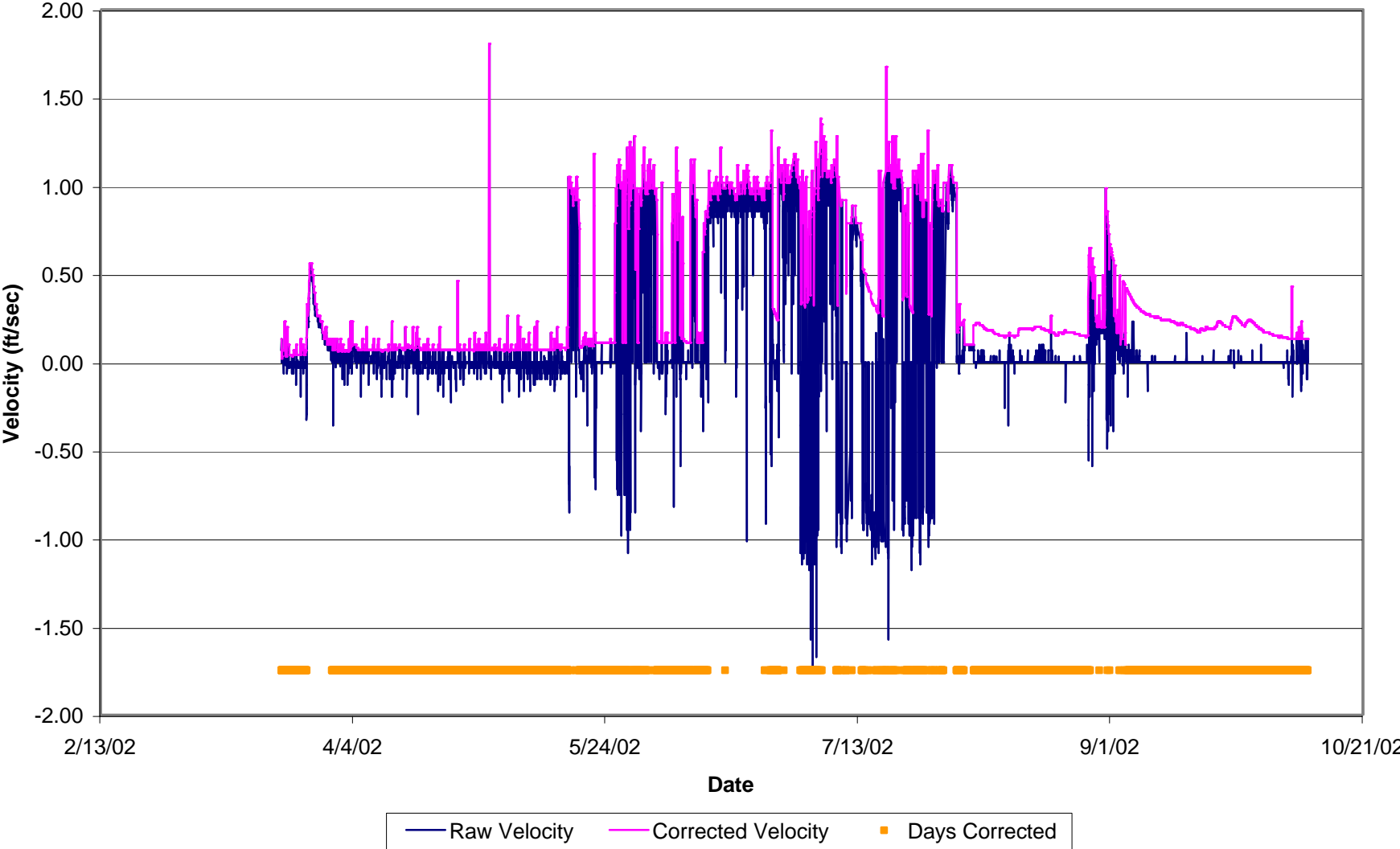


Figure A-23. KREA 32B - Flow and P Concentration

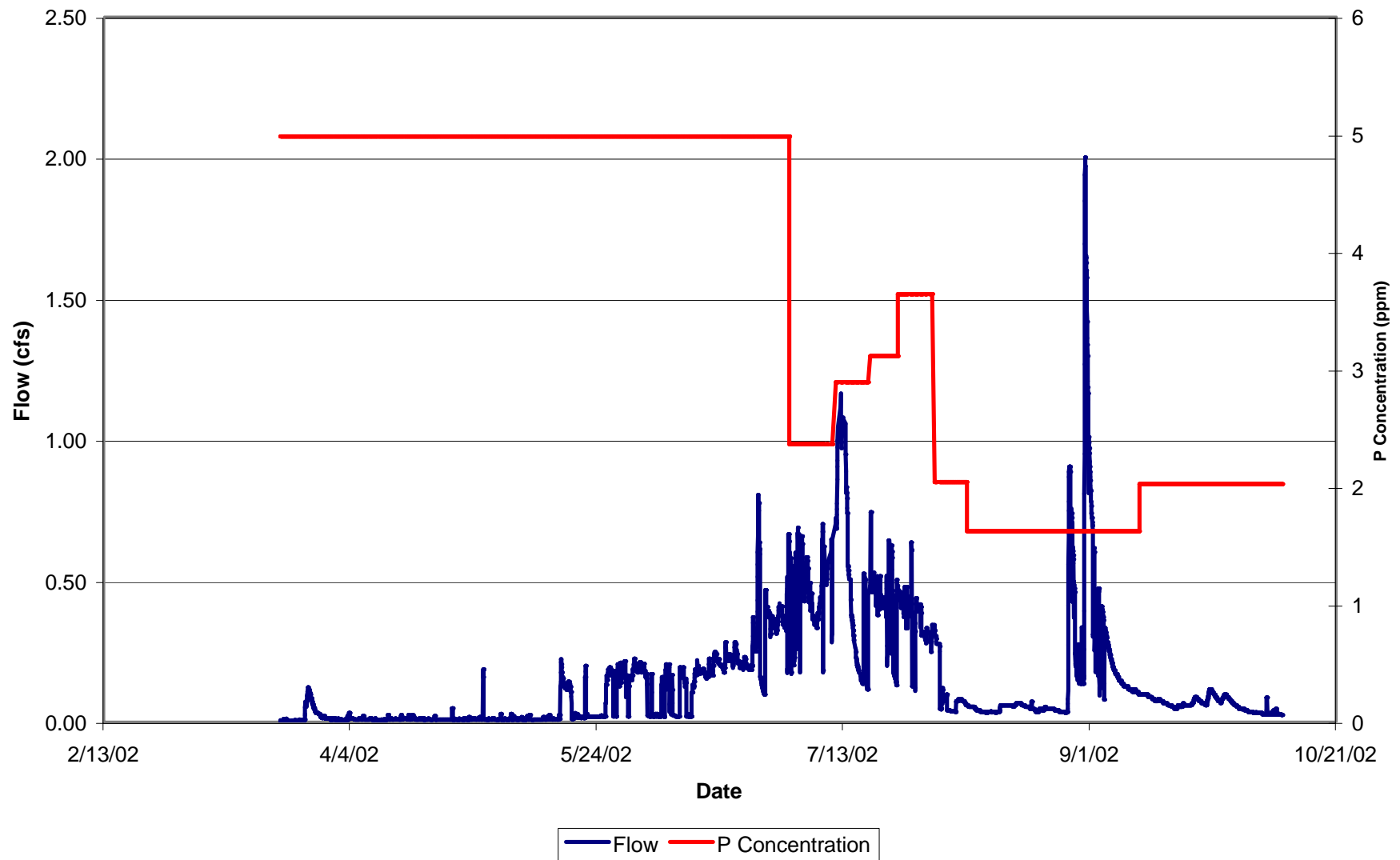


Figure A-24. KREA 49A - Stage

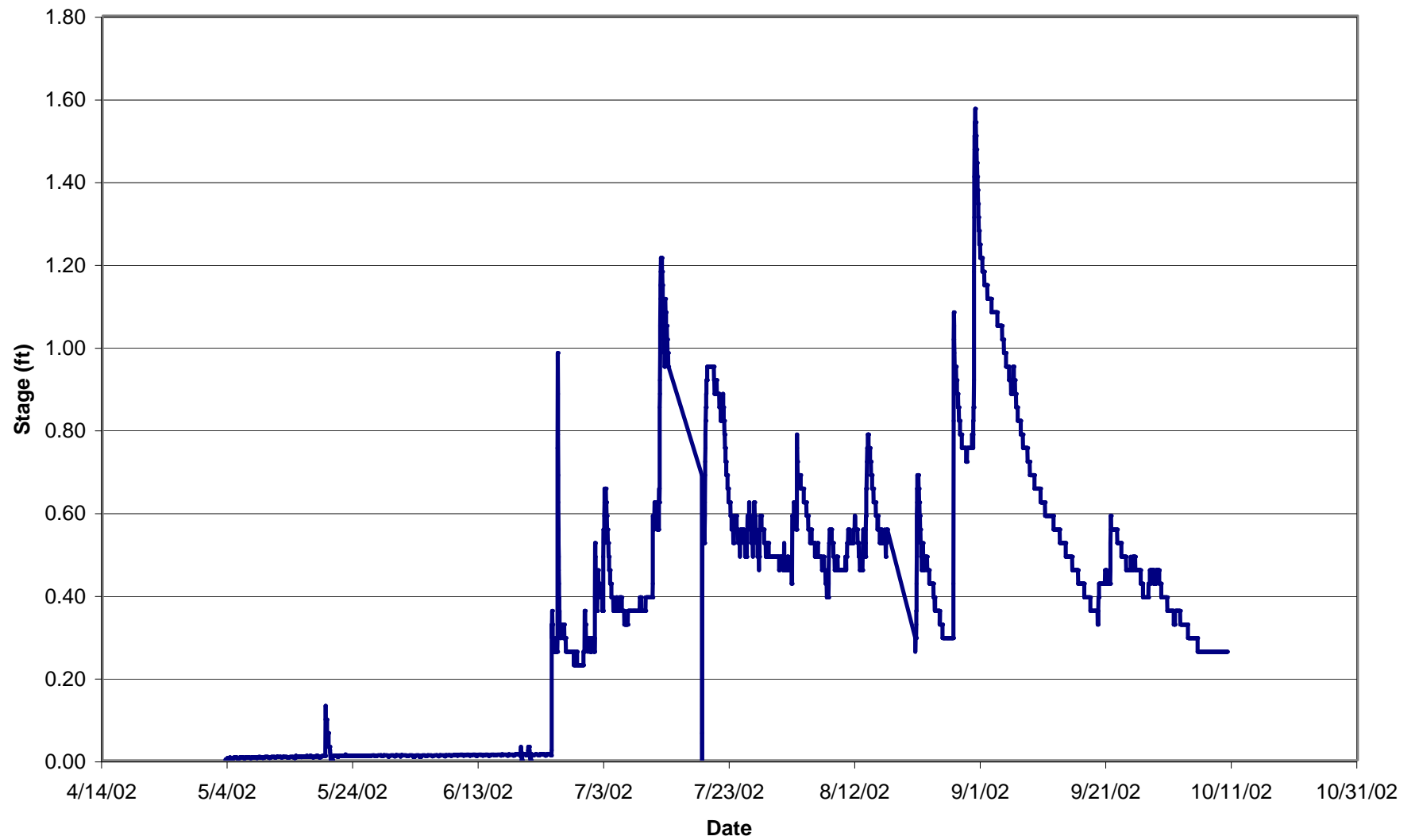


Figure A-25. KREA 49A - Velocity

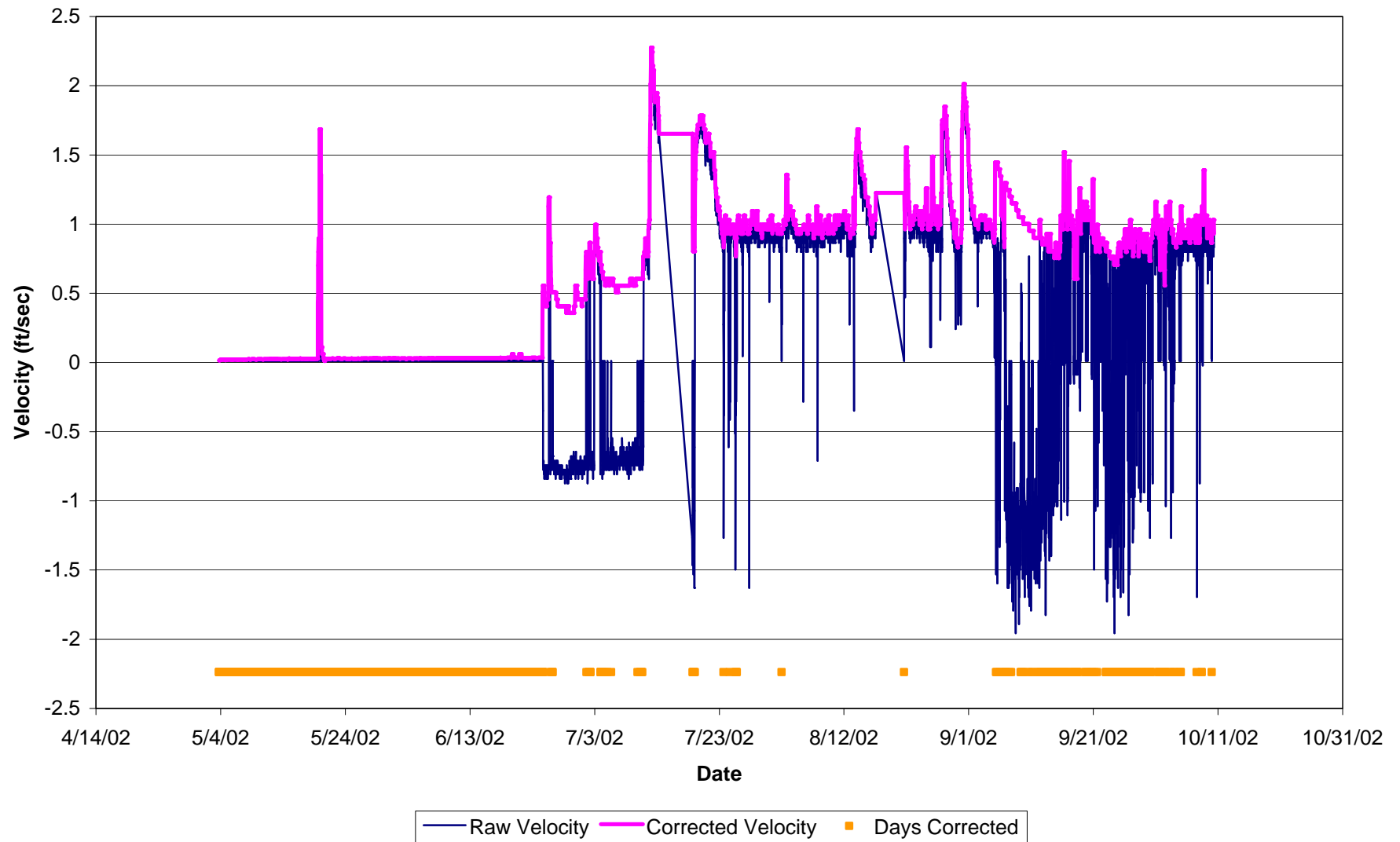


Figure A-26. KREA 49A - Flow and P Concentration

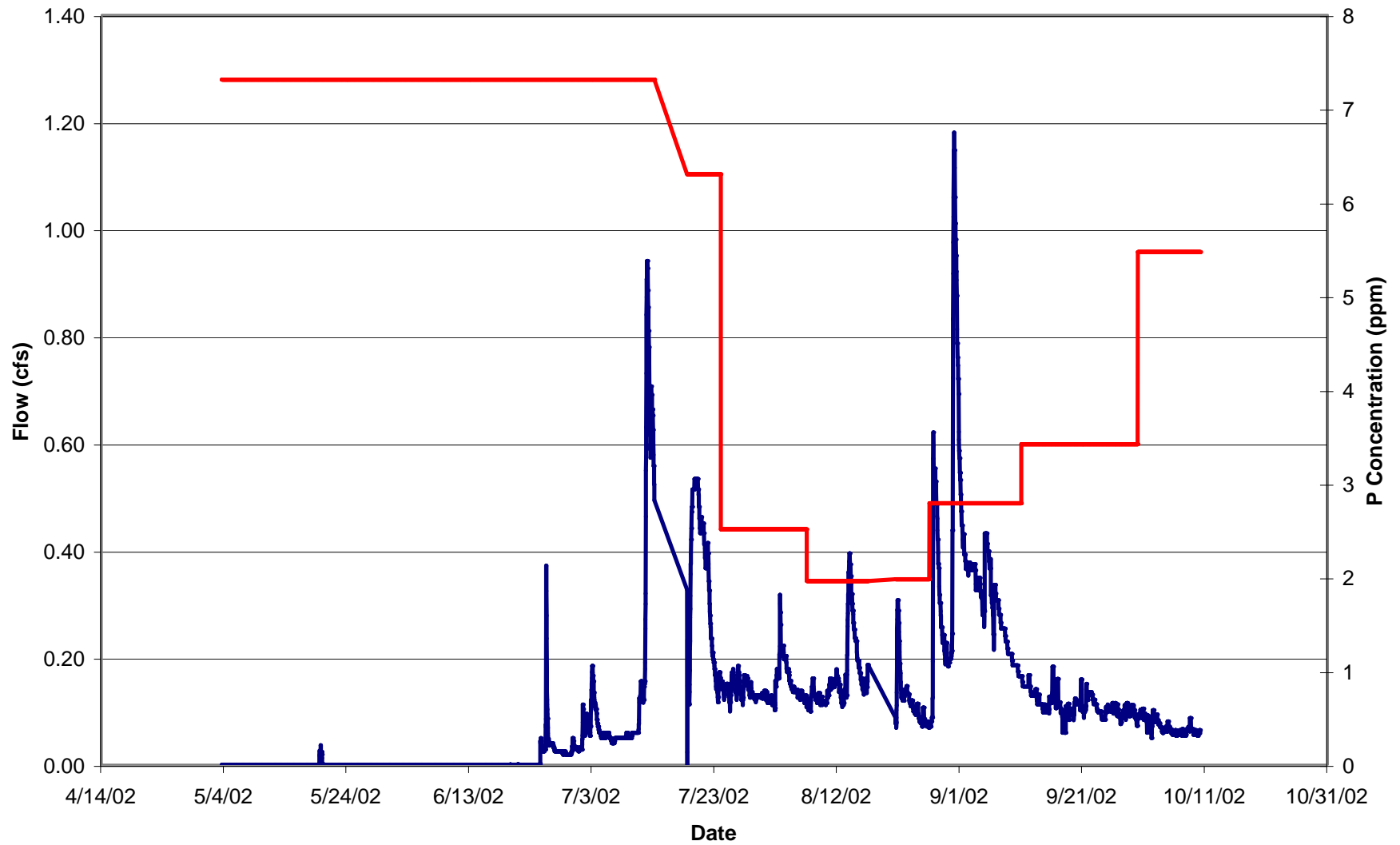


Figure A-27. Total P Concentrations at Monitoring Sites

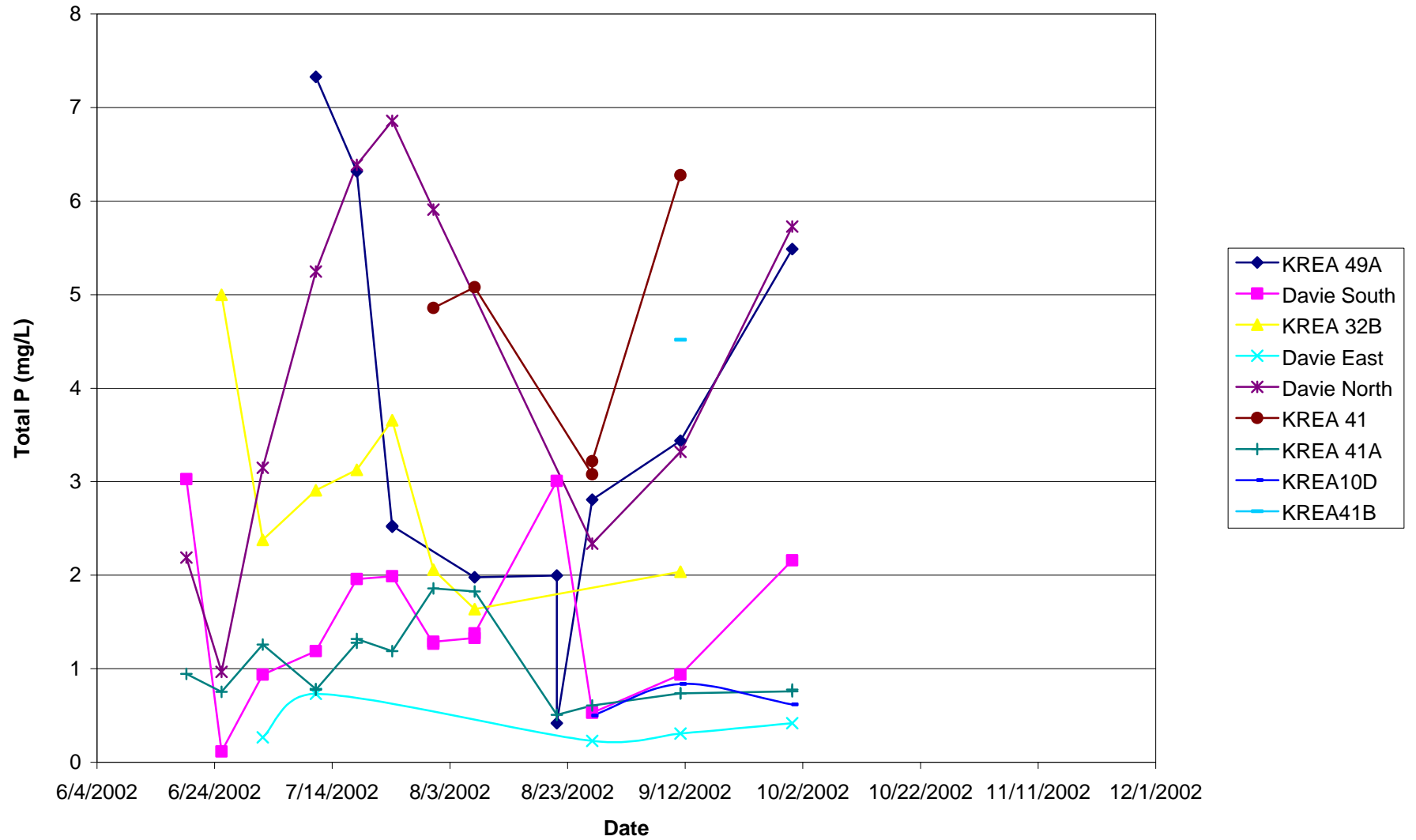


Figure A-28. Fecal Coliform at Monitoring Sites

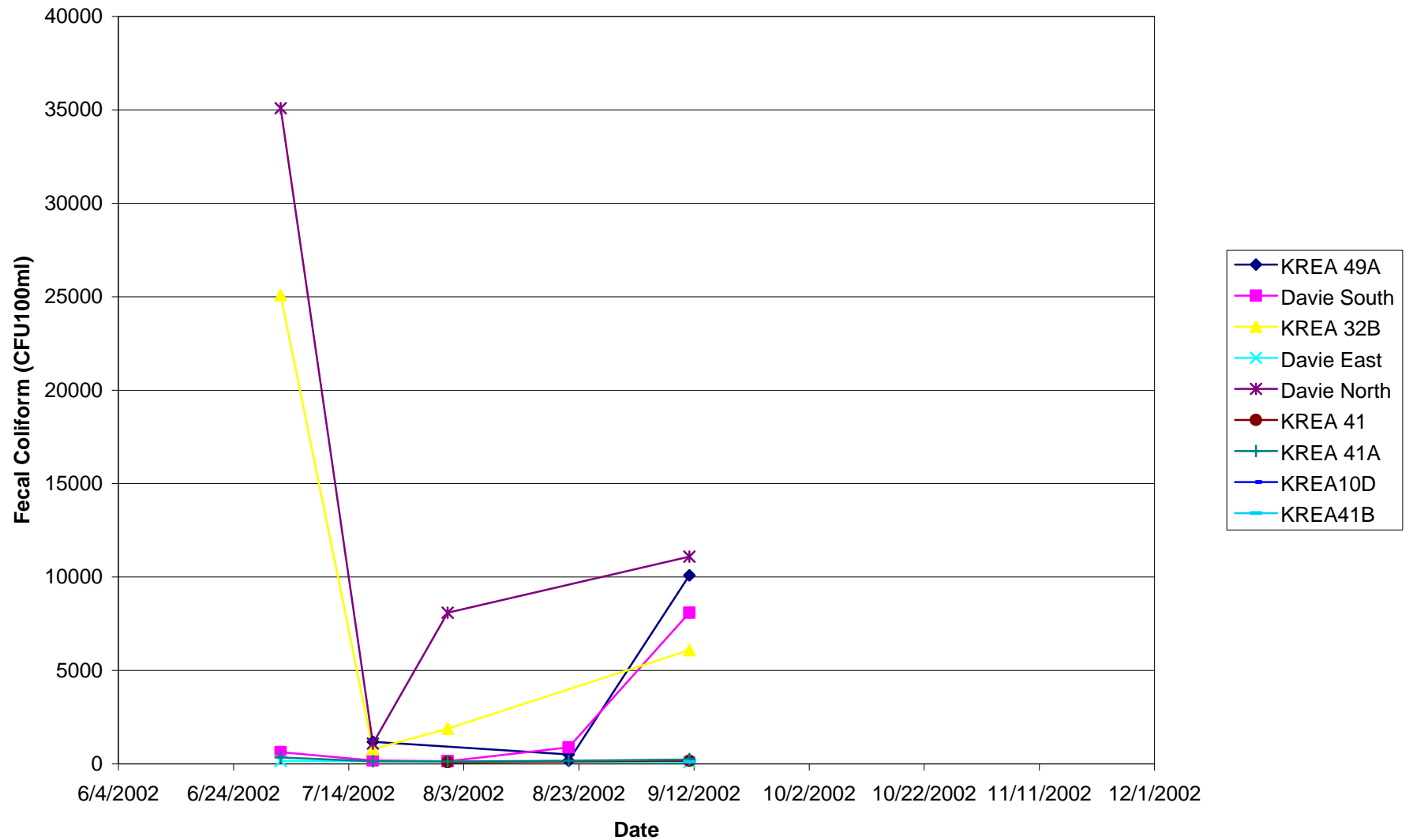
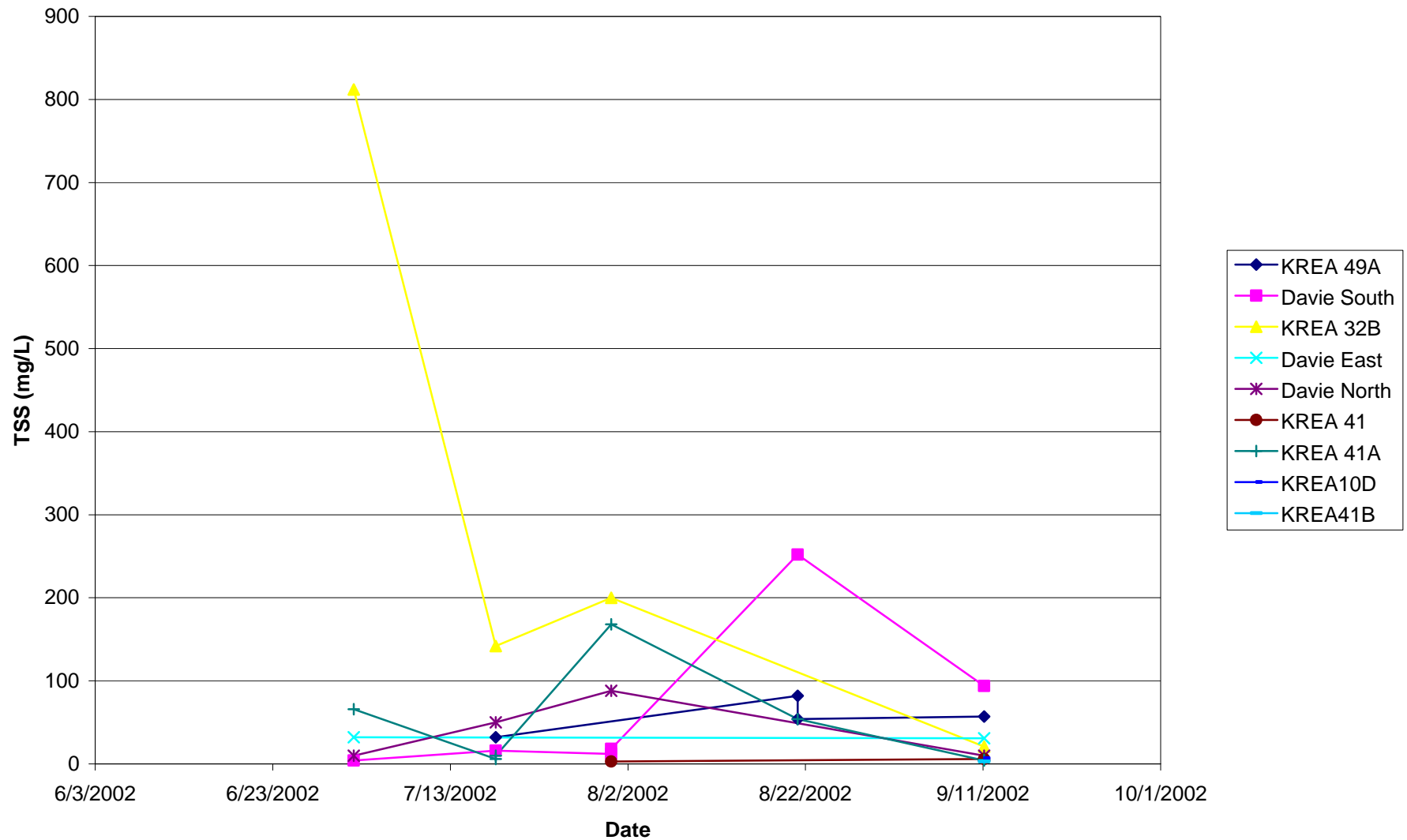
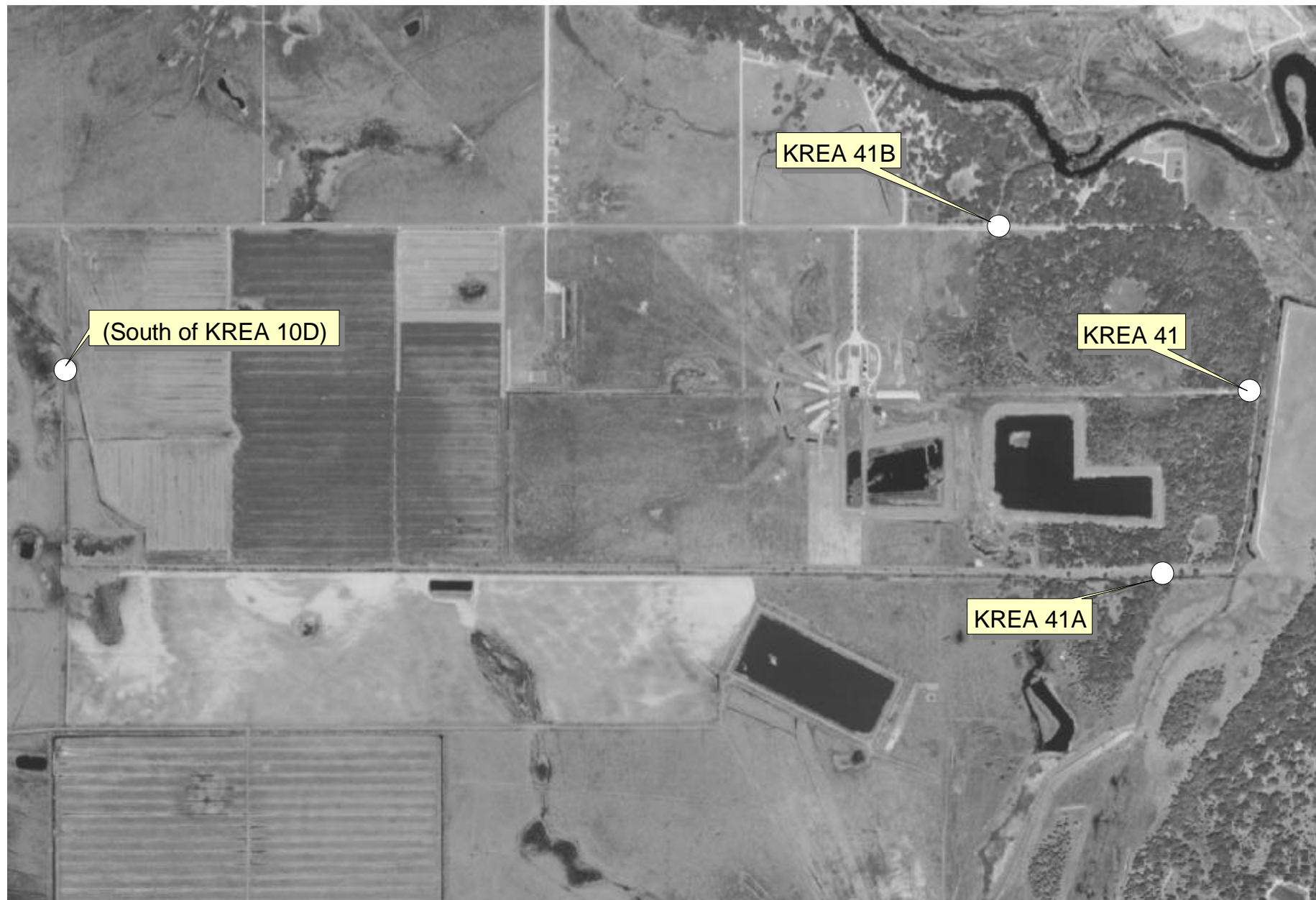


Figure A-29. Total Suspended Solids Concentrations at Monitoring Sites



APPENDIX B

MAPS OF MONITORING LOCATIONS

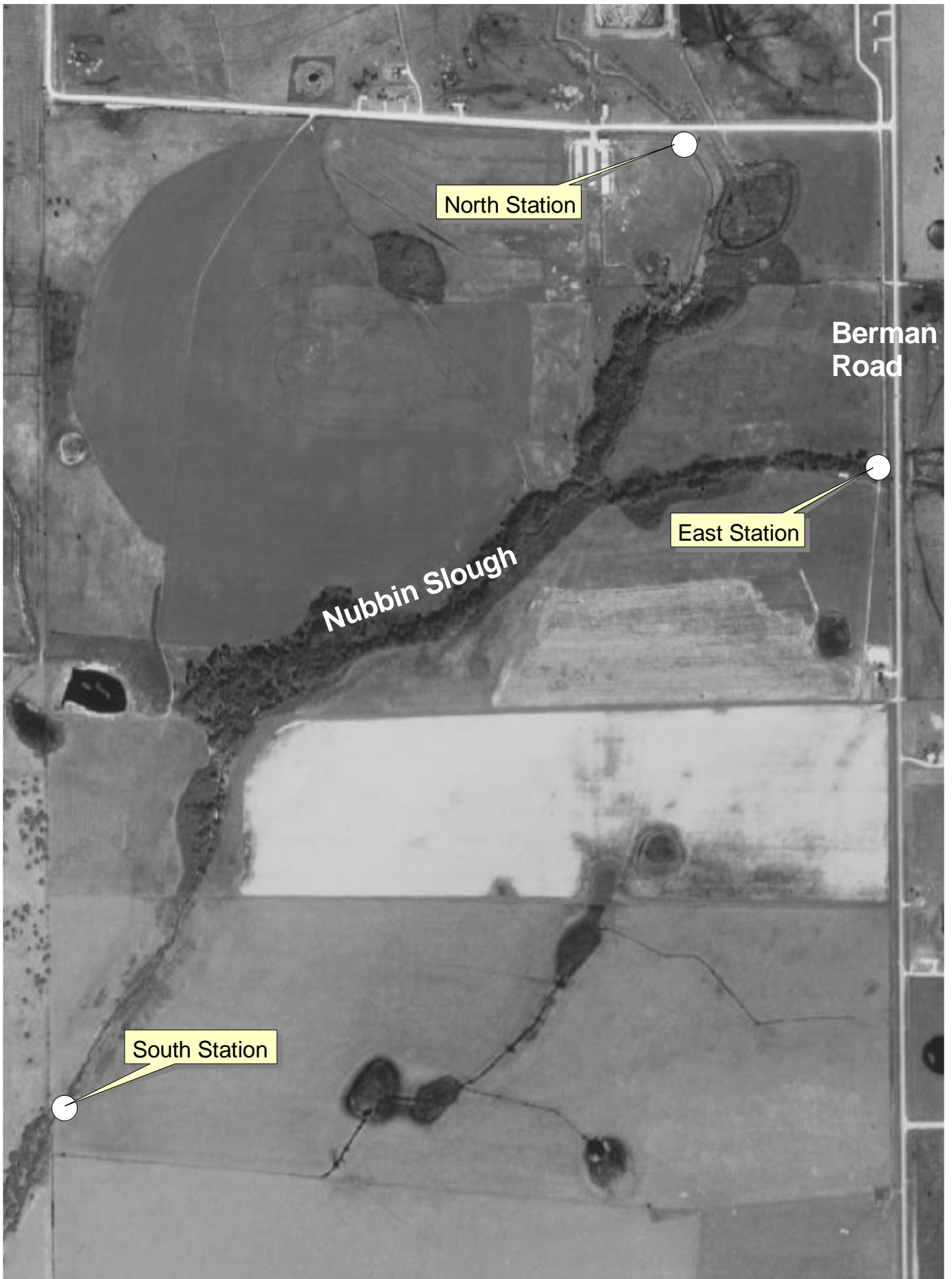


Prepared By
SWET, Inc.

**Dairy BAT Monitoring Sites
at Butler Oaks Dairy**

0.1 0 0.1 0.2 0.3 Miles





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Dairy BAT Monitoring Stations
at Davie Dairy

0.1 0 0.1 Miles





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Dairy BAT Monitoring Sites
at Dry Lake Dairy

0.2 0 0.2 Miles

